In This Issue—*Driving All Wheels of the Car*

MOTOR AGE

Vol. XLVIII
Number 5

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CHICAGO, JULY 30, 1925

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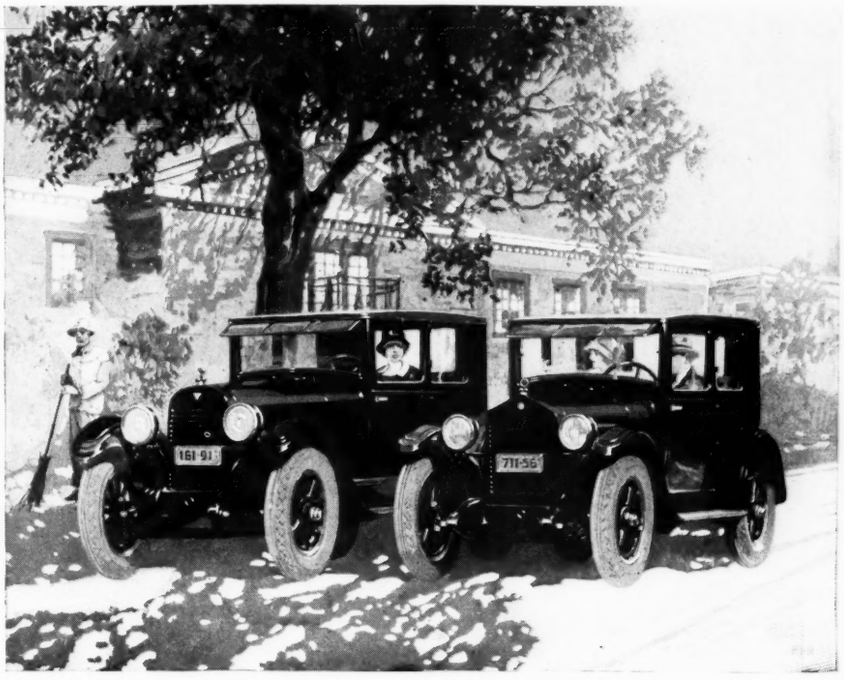

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Master Mechanics everywhere are using Bonney *C. V. Chrome Vanadium Wrenches

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Makers of Special Service Wrenches of Chrome Vanadium, Carbon Steel Drop Forged Wrenches, Stillson Wrenches, Vises and Drop Forgings and the Bonney Rim Tool.

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(Patents Pending)

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The MOON "Year Ahead" Six

The DIANA Light Straight 8

Get on a Winner

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It simply proves that if you give the people what they want they will reward you beyond your fondest hopes.

For years people have wanted a light quality car, equal in style and performance, superior in economy and convenience to the heavy costly cars. Moon dealers are now reaping the harvest of this demand with a complete line of individual Sixes and Eights, which puts the Moon line in a "quality-plus-price-plus-performance" class by itself.

Get on a winner—wire your reservations now. Your territory may be open today and closed tomorrow.

We are handling applications as they come. The first man with the right qualifications wins.

You don't need a large amount of capital. What we want are men with the business sense and shrewdness to cash in on the greatest selling enterprise of today's market. If you are that man let us hear from you today.

As long as there is an automobile business you will find Moon among the leaders.

MOON MOTOR CAR COMPANY • SAINT LOUIS • U. S. A.

ECLIPSE

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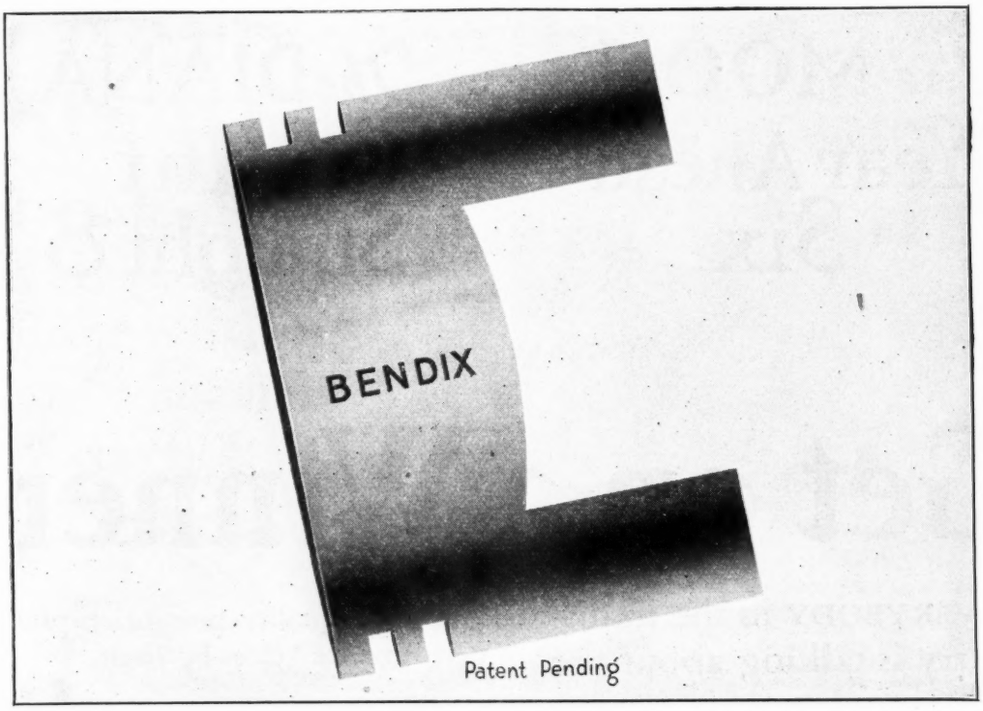

CAUTION: In our Bendix Drive advertisements, appearing regularly each month in The Saturday Evening Post and The Literary Digest, the public is being cautioned to buy none but genuine parts and to look for the name "Bendix" on each part.

Easily and Quickly Installed

The Eclipse Bendix Repair Sleeve requires no special tools for installation. Only a hammer and blunt chisel. Four sizes service all models.

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***GENUINE* PARTS**

FOR

ECLIPSE BENDIX DRIVE

ECLIPSE MACHINE COMPANY, ELMIRA, N.Y.

ECLIPSE MACHINE COMPANY, *Ltd.*, WALKERVILLE, ONTARIO

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MOTOR AGE

Reg. U. S. Pat. Office

Vol. XLVIII No. 5

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Subscriptions accepted only from the Automotive Trade
Entered as Second Class Matter Sept. 19, 1899, at the Post Office at Chicago, Ill., under Act of March 6, 1879.

THE NEW IMPROVED
JUNIOR AND MIDWAY
Westinghouse Air Springs

Announcing—

New Designs and a New Wholesale Policy

AND MORE PROFITS FOR DEALERS!

There are three new things the trade should know about the Midway and Junior Westinghouse Air Spring.

1. New in design including mechanical improvements. Perfect in action, self-lubricating, long lived and fool proof.

2. Installed with new no-cut brackets, integral and interchangeable with standard car brackets, easier and quicker to install.

3. A new wholesale policy—selling direct to dealers at a large margin of profit. The dealer does the installation profitably.

You can make real money selling and installing Westinghouse Junior and Midway Air Springs. They are made for practically every type of car. Juniors for cars up to 3000 lbs.—Midway 3000 lbs. to 4000 lbs. Easily and quickly installed, last longer than the car and make the car last longer.

Westinghouse Air Springs—the finest known device for shock elimination.

Westinghouse Air Springs are made for every type and size of car, truck and bus.

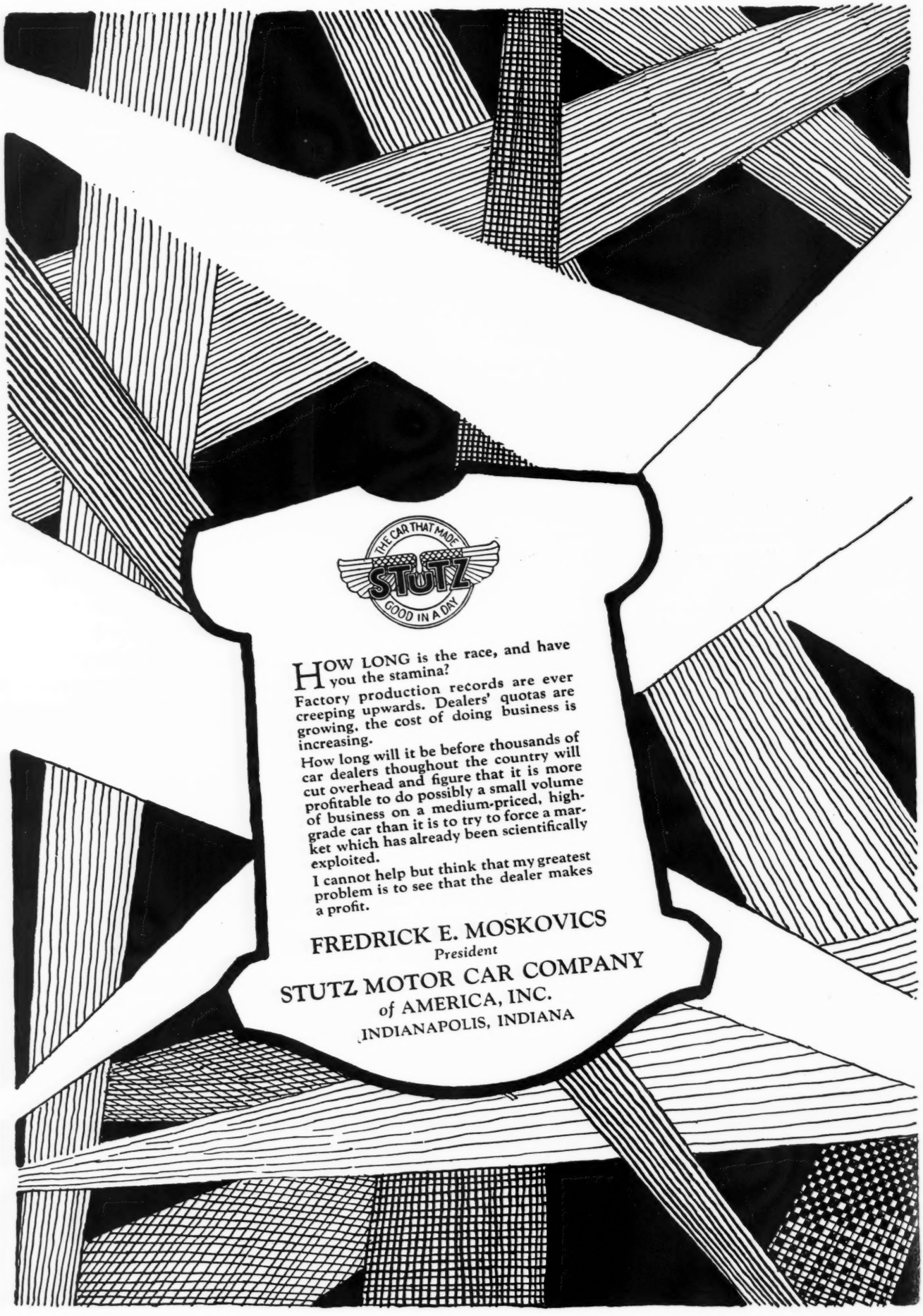
Get our wholesale prices and full details at once.

Address Dept. M

THE WESTINGHOUSE AIR SPRING CO.
NEW HAVEN, CONN.

New York
Boston
Philadelphia
Atlanta

Chicago
Cleveland
San Francisco



HOW LONG is the race, and have you the stamina?

Factory production records are ever creeping upwards. Dealers' quotas are growing, the cost of doing business is increasing.

How long will it be before thousands of car dealers thoughout the country will cut overhead and figure that it is more profitable to do possibly a small volume of business on a medium-priced, high-grade car than it is to try to force a market which has already been scientifically exploited.

I cannot help but think that my greatest problem is to see that the dealer makes a profit.

FREDRICK E. MOSKOVICS
President
STUTZ MOTOR CAR COMPANY
of AMERICA, INC.
INDIANAPOLIS, INDIANA

Now-a One-Profit Car *in the Quality Field*

STUDEBAKER has achieved one-profit manufacture in the quality field. This marks a new era in the automobile industry. Studebaker's achievement eliminates unnecessary profits running up to $500 on a single car. It banishes double overhead. It results in quantity production of quality cars. It vitally affects pricing by establishing a new criterion of value in the fine car field.

TWENTY-FIVE years ago practically all "manufacturers" of automobiles were nothing more than assemblers. They purchased motors, bodies, tops, axles, etc., from parts makers who were the manufacturers in reality.

On this basis it was easy to become an automobile "manufacturer," and more than five hundred makes of automobiles have had their day in the American market and disappeared. They are represented only by "orphan cars" with practically no resale value.

Notwithstanding this writing on the wall many manufacturers still assemble their product, piling profit upon profit for the ultimate purchaser to pay. Each profit which an assembler pays to a body builder or parts supplier enters into his costs just as though he had spent the money for steel or plate glass or upholstery. Although it represents no value he not only passes it on to the purchaser but figures his own profit on top of it.

* * * *

One-fourth of all American passenger cars built today belong in the fine car field—a total of 57 different makes selling above one thousand dollars.

The Ford is a one-profit car and reigns supreme in its field.

In the fine car field Studebaker—and Studebaker alone — now offers the American public one-profit values.

During the past seven years, when demand exceeded supply, Studebaker has been plowing earnings back into plants and machinery until the total exceeds sixty-two million dollars and we are now able to make this announcement.

Foundries, stamping mills, forges, machine shops, are now complete. As final links in the chain of one-profit production, the enormous Studebaker body plants have been operating for months at peak capacity. Resources totaling one hundred million dollars are concentrated on the production of this one-profit car.

No other individual manufacturer in the world (except Ford) possesses such facilities for the complete manufacture of automobiles.

That is why Studebaker is able to put finer steel, finer wood, finer upholstery, better workmanship, scores of thousands of miles of excess transportation, into every car — yet keep down the price to you.

This sound manufacturing principle not only holds down price, but it insures a better car regardless of price. The car is a unit freely designed and engineered for maximum efficiency.

Last winter at the New York and Chicago automobile shows three well-known automobile manufacturers exhibited coaches mounted on the same body—a body made from the identical dies, jigs and fixtures.

Individuality of style, design and construction was thus forfeited to necessity. Contrast this with Studebaker, where the entire car is designed and built as a unit—and engineered complete. This construction means (1) longer life — (2) greater comfort in riding — (3) greater freedom from repair expense—(4) greater resale value.

With the advent of this one-profit-one-overhead plan of motor car manufacture, it is folly today to buy a car by the same comparisons you used yesterday. Today you must measure all cars with this "one-profit" Studebaker.

* * * *

There are 21 Studebaker body styles available on three different chassis. The Standard Six Models, 113-inch wheelbase, 50 h.p. engine, $1125 to $1650 f.o.b. factory. The Special Six Models, 120-inch wheelbase, 65 h.p. engine, $1450 to $2150 f.o.b. factory. And the Big Six Models, 127-inch wheelbase, 75 h.p. engine, $1875 to $2650 f.o.b. factory.

And you may buy your Studebaker today with the assurance that it will not be arbitrarily stigmatized by any act of ours as a "last year's model." Instead of spectacular annual announcements of "new yearly models," Studebaker has adopted the policy of keeping its cars up-to-date in body styles and chassis design every day in the year. Therefore, *buy your Studebaker now!*

Why Studebaker is the "one-profit" car

There are more than 60 makes of passenger cars built in the United States, but very few are manufactured complete in the plants of the producers who sell them.

Only 42 build all their own motors—and one of the 42 is Studebaker.

Of the 42 which claim to make their own motors only 14 make the iron castings, stampings and forgings which go into their motors—and one of the 14 is Studebaker.

Only 5 make all their own bodies and one of the 5 is Studebaker.

Only 2 make all their own motors, bodies, clutches, springs, axles, gear sets, differentials, steering gear, gray-iron castings and drop forgings. One of these 2 is Studebaker and the other is Ford.

THIS IS A STUDEBAKER YEAR

The STUDEBAKER CORPORATION of AMERICA

NASH

Nash Leads the World in Motor Car Value

YOU ARE BEHIND THE TIMES WITHOUT 4-WHEEL BRAKES

America Greets New Nash Models with Record-Breaking Crowds

By the hundreds of thousands American men and women have thronged Nash showrooms from one end of the country to the other since Announcement Day, Thursday, July 23.

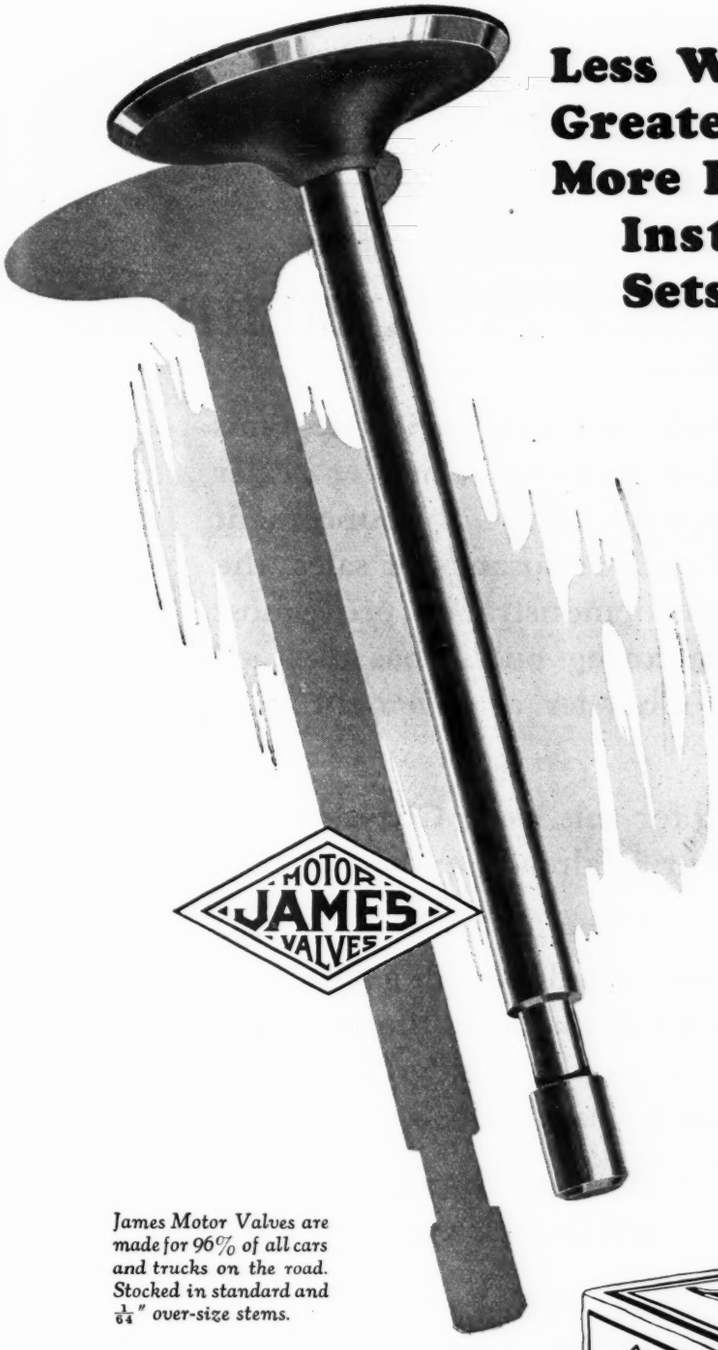
And the nation-wide enthusiasm these new Special Six and Advanced Six models have already created has launched Nash on a new year bound to eclipse by far the phenomenal success of the past twelve months.

Attendance has been so heavy that thousands have been prevented from adequate inspection of the new models so that Nash showrooms everywhere are extending the Special Introductory Exhibition for a period of two weeks more.

"The Country Has Gone Nash"

THE NASH MOTORS COMPANY
KENOSHA, WISCONSIN

(2101)



James Motor Valves are made for 96% of all cars and trucks on the road. Stocked in standard and $\frac{1}{64}$" over-size stems.

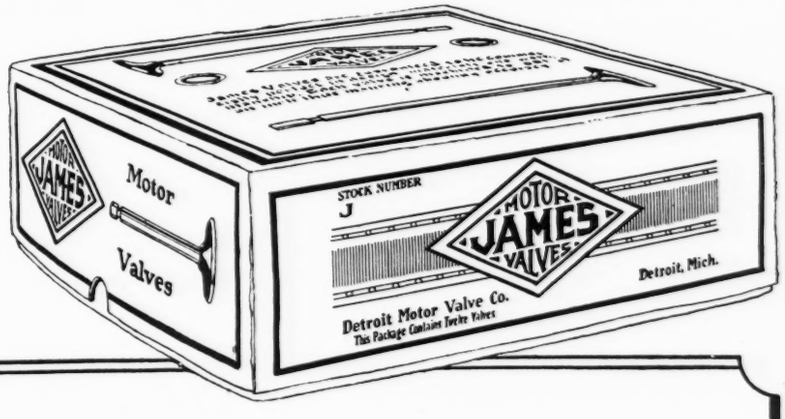
Less Work—
Greater Satisfaction—
More Profit—
Installing Complete New Sets of James Motor Valves

You can do a faster job; assure absolute satisfaction to the car owner; and *increase your earnings* by following the experience of successful garage and repair men in installing *complete new sets* of valves instead of regrinding the old ones. And the completed job will cost the owner no more.

James Motor Valves are precision made —exact duplicates of the original valve equipment.

The most advanced ideas and methods in valve manufacture are employed, assuring the highest quality in design, materials, and workmanship. A rigid series of inspections guarantee absolute uniformity. Each valve is carefully treated and wrapped in wax paper to insure the preservation of the original fine finish.

Jobbers and dealers in every section of the country are handling the James line because it is the *better* valve. If you are unable to secure James Valves from your present source of supplies, write us and we will see that your requirements are filled immediately.



JAMES MOTOR VALVE COMPANY

1350 Maple Street Detroit, Michigan

(2101)

Another Chrysler Achievement

Hundreds and hundreds of enthusiastic telegrams tell the story of a million visitors to Chrysler dealer sales rooms within the week of the announcement of the new Chrysler Four. Thousands of sales, the majority of them without demonstration, prove most graphically that the motoring public has received this latest Walter P. Chrysler achievement with unparalleled acclaim.

So great is the demand for this latest Chrysler that production on the Four is already exceeding 500 cars per day.

To any dealer who is interested we will gladly send copies of telegrams from all parts of the country, which tell better than we can the wonderful quality and value of the Chrysler Four.

With the new Chrysler Four as companion car to the Chrysler Six, dealers tell us their profit possibilities are more than doubled.

Have you the valuable Chrysler franchise? If not, write for details.

CHRYSLER SALES CORPORATION, DETROIT, MICH.
CHRYSLER CORPORATION OF CANADA, LIMITED, WINDSOR, ONTARIO

The New
CHRYSLER FOUR

MOTOR AGE

Vol. XLVIII | July 30, 1925 | No. 5

Summary and Index of Important Events in

This Week's Automotive News

Detailed Stories from* MOTOR AGE *Staff Writers and Special Correspondents Appear in News Section Beginning on Page 32

AUTOMOBILE sales volume continues ahead of same period last year. Regular seasonal declines ratio appears unchanged but new models and price changes keep buying interest at peak. Page 32.

Wisconsin insurance commissioner opposes Chrysler policies and threatens action if company persists in plan. Page 33.

Dealers report stocks of old-style models unusually low, putting them in excellent position to receive new types. Page 33.

Fisher announces purchase of Fleetwood Metal Body Company. No change in policy planned. Page 33.

Michigan registrations this year expected to reach 955,000. Page 32.

Tire dealers advised by national association to buy only for 40-day turnover as result of mounting rubber prices. Page 32.

Registrations in Louisiana are expected to reach 200,000, or about 21,000 more than in 1924. Page 32.

Output of automobiles in Canada during 1924 decreases about 10 per cent, government report says. Closed car production rises above 1923 figure, but open models bring average down. Page 42.

Antoine Ascari, dealer at Milan, Italy, wins European Grand Prix at Spa, Belgium, with straight-eight supercharged Alfa Romeo car. Page 34.

Extra dividend of $6.50 per share on the common stock is declared by Nash Motors Co. Net income for quarter is nearly $3,000,000 greater than in same three months last year. Page 38.

Dodge Brothers begins program of expansion at factory which will enlatge output from 1,100 cars as at present, to 1,500 automobiles daily. Page 43.

World-wide survey of air transportation possibilities and advantages from economic standpoint will be carried out by Department of Commerce and the American Engineering Council. Page 43.

Parts, accessory and service business during first six months of 1925 runs substantially ahead of same period of 1924, M. & A. M. A. figures show. Page 35.

Delegation of American rubber manufacturers urges Secretary of State Kellogg to make representations to Great Britain regarding the restriction of raw rubber output. Page 35.

Chevrolet expects production, at present rate, to equal entire 1924 total by first of August. Page 42.

Ruinously low prices for used cars cause California dealers in new and rebuilt automobiles much concern. Page 38.

In Next Week's Issue—Accurate Diagnosis Makes Repairing Easier

The Junior Eight Special, a Miller-built racing car in which the drive was applied to the front wheels only. The excellent performance of this car at Indianapolis this year caused much favorable comment and showed especially well the apparent desirability of pull over push in propelling a race car around curves at high speed.

Driving All Wheels Of A Car

Making Every One an Independent Tractor and Brake. What Multiple Drive Design Vehicle Offers in Performance and Economy of Operation.

By B. M. IKERT

IN analyzing present day motor car design a point is reached where the future would seem to hold much for the multiple drive car.

Briefly, such a vehicle is one wherein the engine power and brake is applied equally to all, instead of the rear wheels only, as in the conventional car of today. A multiple-drive car may have four, six, eight or in fact any number of wheels.

The performance of the Miller-built "Junior Eight" front wheel drive car which finished second in the recent 500-mile Indianapolis race upset a good many theories about such cars being unmanageable, tricky to steer, and so on.

It is true the power in this car was not applied to all four wheels, but during the race it was clearly demonstrated that applying the power to the front wheels need not interfere with steering.

Many have claimed that the front wheels cannot be driven and steered at high speed. We have only to recall the "Junior Eight" averaged about 100 miles per hour for the 500 miles and "held the track" fully as good or better than the rear wheel driven cars to discount this claim.

At the conclusion of the race many comments were made as to the possibilities of adapting front wheel drive to passenger cars and motor vehicles in general. One newspaper said after the race: "The front wheel drive car developed by Harry Miller proved itself in the most gruelling test that can be given to a mechanical design, and its success here presages what may be a new development in passenger car design."

In the belief that there was something to say at this time on the subject of driving and braking on all wheels, a representative of MOTOR AGE interviewed Mr. P. J. F. Batenburg, Consulting Engineer, who has done considerable work on the development of multiple-drive automotive vehicle design.

Consequently what follows are largely the thoughts of Mr. Batenburg as presented to the author in this interview.

While it is entirely possible to adapt front wheel drive to motor cars, it is not very probable. The job still would be but half done, many claim, as it now is in driving the rear wheels only.

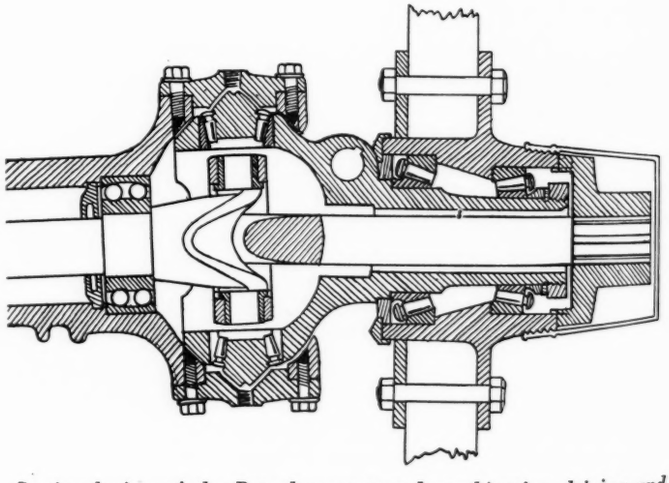
Advantage of Pull Over Push

It would have the advantages, to a certain extent, of pull over push when it comes to moving a load. This might well be illustrated in a workman turning around and pulling a wheelbarrow over a curb when it cannot be pushed over.

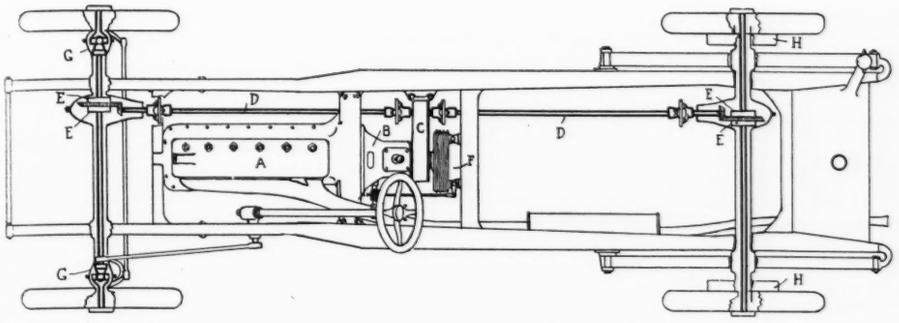
In aircraft practice the tractor (puller) type of plane has superseded the pusher to the almost total exclusion of the latter type. The item of stability, speed and maneuverability has been improved in the plane by the adoption of the tractor type wherein the propeller, the pulling power, is placed at the front of the plane.

It may be of interest to know that a car in which all four wheels were driven was bought in 1912 by Mr. Matthew Worth Pinkerton of the firm of A. E. Pinkerton & Company, detective agency which operated over the United States. Mr. Pinkerton desired a car which could negotiate any sort of road and under all conditions. Mr. Batenburg related the following experience Mr. Pinkerton had with the car:

It seems that in some particularly bad going where there was no road to speak of, the left front wheel steering arm broke. The tie rod was removed and for 60 miles, including the down-town section of Chicago, the car was steered with the right hand wheel only. The left wheel, which, of course, was driven by the engine, automatically followed the direction of travel of the other front wheel. Since the wheel had power applied to it, less resistance was encountered, which with the caster of the axle made it possible for the wheel to function practically the same as though the tie rod and steering arm had been in place.



Sectional view of the Batenburg patented combination driving and steering axle as used on a multiple drive car. That it is possible to safely and efficiently combine steering and driving was demonstrated in the front-wheel drive car which finished second in this year's 500-mile Indianapolis race.



Schematic diagram of a multiple drive car as laid out by Mr. Batenburg. Due to absence of differentials and substituting for these the driving and braking devices shown at E, each wheel becomes an individual tractor and brake. In the above diagram A is the engine; B, clutch and transmission; C, sub-transmission; D, drive shafts (interchangeable); E, driving and braking devices (all parts interchangeable); F, multiple brake, operating on all wheels; G, driving and steering axle; H, rear wheel brakes, to hold car on hill, etc.

In a conventionally designed motor car the front axle is dragged along by the springs. This means, then, that every time the front wheels drop into a chuck hole or encounter an obstruction they are dragged out, rather than rolled out, as they would be if power were applied to them.

At this point it is well to mention that multiple-drive vehicles have generally been looked upon as "stunt" cars, to perform in places only where the going is bad or where adverse road conditions exist.

It is true during the war trucks in which all wheels were driven performed admirably under the most terrible conditions, and this fact, no doubt, has given rise to the general impression that driving front and rear wheels of a motor vehicle is applicable to trucks only.

This is not so. It is reasonable to believe if a motor vehicle in which all the wheels are driven possesses advantages under adverse conditions it also will possess these under more favorable conditions, even if it meant but the use of a smaller power plant with resultant economy.

As less resistance is encountered in a multiple-drive car, naturally less power is required to propel the vehicle. In rear wheel driven cars the entire load is lifted and pushed from the rear, because the front axle is not a live axle. In a multiple drive car the load is more equally distributed on both axles, which are alive and offer a combination of simultaneous lift, push and pull, with a natural tendency to climb.

Every Wheel Independent Tractor

Multiple driving and braking means that every wheel is entirely independent of the others and a multiple-drive car could be moved under its own power even if any three of the four wheels were off the ground.

Unlike a vehicle fitted with an ordinary differential or compensating gear a multiple drive car does not get stalled when one of the wheels becomes mired, nor will any of the wheels spin on ice or slippery surface.

In a car fitted with a conventional differential gear, spinning of the wheels in mud or on ice takes place because there is little or no resistance to the drive and because of the differential mechanism affecting both wheels. Hence the wheel on firm ground offers more resistance and consequently the mired or free wheel is spun by the engine since the planetary gears of the differential simply run around the side gear of the axle shaft on the stationary wheel.

Differential gears are not found therefore in a multiple drive car. The mere fact of driving front and rear wheels of a car does not constitute a multiple-drive car, according to Mr. Batenburg's viewpoint, so long as differentials are used in front and rear axles, as well as at the center of the two propeller shafts. Such vehicles have been built in the past, and while they offier the advantage of driving the front wheels also, each wheel is not independently driven or braked independently from the others.

In a multiple-drive car each wheel is an independent tractor and brake obtaining traction as traction is available and braking as resistance is obtainable. That is, the wheel or wheels which are on a firm or dry surface take the drive from the engine and in braking the same wheels which have resistance are the ones on which the braking takes place. This means, then, that the brake is not applied to a wheel which does not revolve, as for instance when a rear wheel of a conventional rear-wheel-driven car skids, with the application of the brake. Skidding after all is merely a matter of wheels not traveling the required distance and when a brake is applied under such conditions nothing is accomplished since proper braking can only be had on a revolving wheel. When wheels cease to revolve on a moving car they become uncontrollable sleds.

Climbing and Pushing

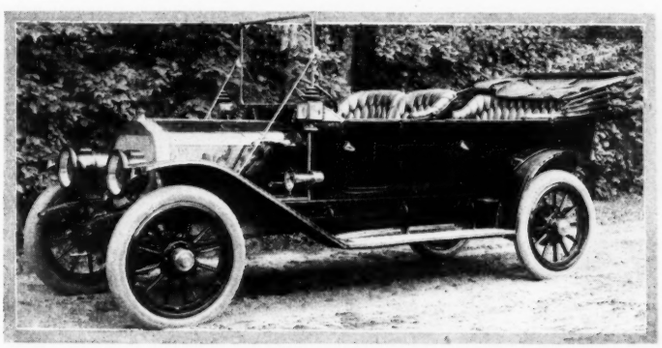
In crossing a ditch there is an enormous advantage in a multiple-drive car, for the front wheels will always climb while the rear wheels push.

Making every wheel an individual tractor and carrier as well, greater traction is obtained in a more efficient manner. The rear-wheel-driven car imparts a long leverage to the front axle, variable with the wheelbase. The front axle being dead is dragged along, meeting with resistance and digging bluntly into the resisting object instead of climbing over it as does the axle in a multiple-drive car.

So far as complication is concerned, multiple-drive offers no particular obstacles and there is no problem in multiple drive construction which is not satisfactorily solved in the conventional rear-wheel drive type of motor car. That is to say, there is nothing freakish about the design of the multiple-drive vehicle.

That the above is true will readily be appreciated by referring to the plan view of a multiple-drive chassis as shown on these pages. Reference to the illustration shows the disposition of the various units in practically the same manner as with a rear wheel driven car. Frame, axles, springs, engine, steering gear, transmission, gasoline tank, etc., are laid out exactly the same as in a conventional car.

The essential difference lies in the use of a driving and



This is a four-wheel drive car built in 1912 for Mr. Pinkerton, famous detective, who at the time stated he wanted a car which could go everywhere and anywhere under all sorts of conditions.

steering axle at the front, the use of a sub-transmission and the placing of the propeller shafts to one side of the center line of the chassis. In addition there is the use of a single multiple brake which operates on all wheels and applies the braking effort in the reverse manner that traction is obtained.

Many of the parts of a multiple-drive car such as illustrated are interchangeable, thereby lowering the production cost and adding materially to the serviceability and maintenance facilities of such a vehicle. Thus the two propeller shafts and flexible joints are interchangeable as well as the driving gears of the axle, together with the driving and braking devices.

Excepting for the fact that the front axle of a multiple-drive vehicle, as shown, is steerable and has, therefore, a different layout at the axle ends, the two axles, front and rear, are interchangeable so far as the housings and axle tubes are concerned. From a production cost standpoint the additional cost of a multiple-drive vehicle will run from 4 to 6 per cent more than for a rear wheel driven vehicle of the same capacity. This additional cost is manifested in a few additional parts necessary to make a live axle out of a dead axle.

The extra power required to drive the additional live axle is insignificant compared to the power conserved. As traction is more easily obtainable there naturally is less strain on the driving mechanism, consequently less wear and tear, smoother operation and more dependability. Since every wheel is an independent tractor and brake in itself there is less chance for skidding and consequently greater safety and easier control.

Having no dead axles, loads can be more equally distributed, which means greater load capacity in less space and less damage to roads. The effect of the power applied to each wheel particularly in starting the accelerating and the load carried by such a wheel should not be underestimated in motor vehicle design and the study of the effect of this energy applied should be of interest to highway engineers interested in road cost and maintenance.

Every person associated in any way with motor vehicles knows that the rear tires of the conventionally designed motor car wear out before the front tires. Hence there will be less tire wear on a multiple drive and brake motor car because the loads are more equally distributed and there is less driving and braking strain per wheel.

From what has been said in the preceding paragraphs it becomes apparent that a multiple-drive vehicle makes possible acceleration and decelleration on all wheels, whereas in the present day design of motor cars it is possible only to decellerate on four wheels since front wheel brakes have come into such prominent use. The advocates of multiple-drive therefore claim that if it is logical to decellerate on four wheels it also is equally logical to accelerate on four wheels. Braking could then be done in the reverse manner than traction is obtained and since there is but one good sized brake located on the end of the transmission it will readily be seen that perfect equalization can be had. To hold the car on a hill a pair of ordinary external band brakes are fitted to the rear wheels only.

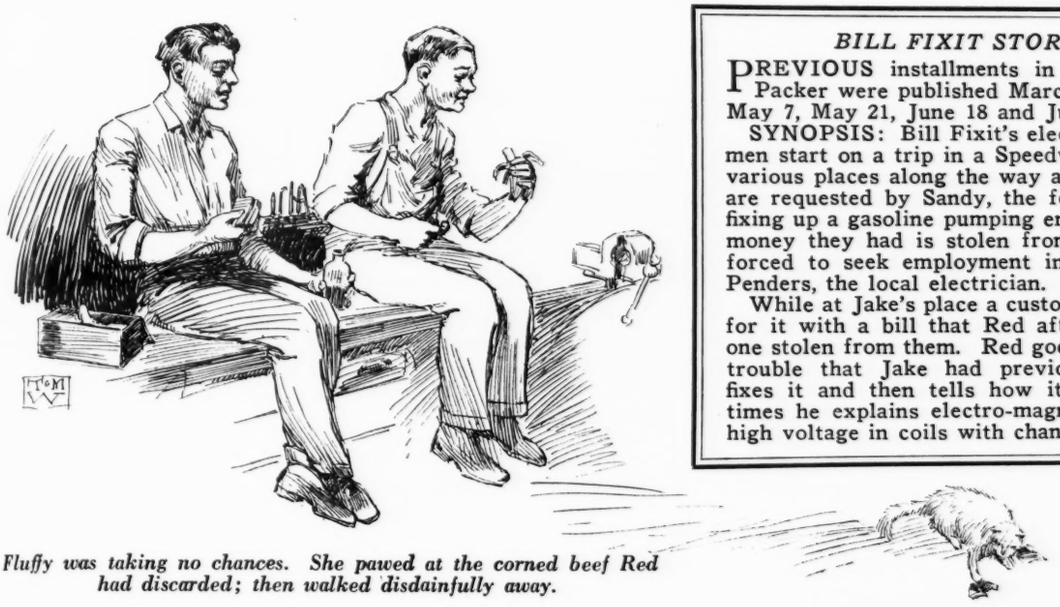
By having but one large service brake which could be cooled properly with flanges or by other means, the maintenance and service work necessary is practically nothing.

Sell the Car, Then Sell Accessories—This is the Way They Do It in the Establishment of a Kansas City Ford Dealer

A successful plan for the sale of accessories for Ford cars has been put into operation by the E. L. James Motor Co., Ford dealer in Kansas City, Mo. After a prospect has been sold a car he is taken into a quiet, luxuriously furnished room to sign the necessary papers. In this room, which is hung with lavender velour draperies, are displayed accessories for Ford cars.

While the car buyer is arranging for the purchase of his vehicle he sits at a desk facing many things for his machine which he should have and many things he would like to have. He sees a motometer, a spot light, a fire extinguisher, bumpers, rear vision mirror, skid chains, steering wheel, vacuum bucket etc.

About the time he has finished writing the check to cover the initial payment he looks up and begins to ask for recommendations on the various accessories. These recommendations are of course readily forthcoming.



Fluffy was taking no chances. She pawed at the corned beef Red had discarded; then walked disdainfully away.

BILL FIXIT STORY NO. 8

PREVIOUS installments in this series by A. H. Packer were published March 19, April 2, April 16, May 7, May 21, June 18 and July 9, 1925.

SYNOPSIS: Bill Fixit's electrical trouble shooting men start on a trip in a Speedway car. They stop at various places along the way and at the Welsh mines are requested by Sandy, the foreman, to help out in fixing up a gasoline pumping engine. While there the money they had is stolen from the car, so they are forced to seek employment in Coal City with Jake Penders, the local electrician.

While at Jake's place a customer buys a tire, paying for it with a bill that Red afterwards recognizes as one stolen from them. Red goes after a job of wiring trouble that Jake had previously fallen down on, fixes it and then tells how it was done. At other times he explains electro-magnets and production of high voltage in coils with change in magnetism.

Ignition Condensers—

When Is a Plumbing Job Like an Ignition System? The Red Head Tells the Answer to This One.

By A. H. PACKER

THE Red Head opened his lunch box and ate one sandwich slowly and thoughtfully. At the second one he decided a little investigation was in order. Removing the inspection cover he discovered a piece of ancient corned beef, picked it gingerly from the under layer and tossed it to Fluffy.

But Fluffy was taking no chances either. She sniffed in haughty manner, gave it a poke with one white paw and walked disdainfully away.

Jake watched with interest the comedy being enacted before his eyes.

"Gettin' tired of that Polock grub they hand you at the boarding house?" Jake hazarded.

"It's not so good," said Red. "Valvy gets by all right, but he has a hollow leg. I'd rather cook my own grub if we only had some place where we could."

"You might live upstairs over the garage," Jake said, half joking. Then added: "That's not such a bad idea either; if you run the gas and water pipes up there we can rig up a stove and a sink and you would be all set to do the dishes or take in washing when work here gets slack."

The boys talked it over and decided to take Jake up on his proposition, so a few days later Valvy started fitting pipe to carry the water to the upstairs kitchen. It was new work but Valvy liked it for a change and two days later things were in readiness for the amateurs to start housekeeping.

Red tried the faucet over the sink; the water flowed, but what was that rumbling knock as the faucet was turned off? Jake heard the hammering of the water in the pipe and came running up to see if a blacksmith shop had been opened on the second floor without his knowledge.

The faucet was a new one, so that could not be the trouble, but every time the water was turned off there was a hammering knock which jarred the whole building and seemed to threaten to crack the pipe itself.

"I see it all now," said Red. "There's no condenser."

"Condenser?" asked Jake. "Are you kidding or what? I never heard of condensers except in ignition or else in a power house where they use a different kind to change the old used steam back into water again. But with nothing but cold water up here, you will not need to worry about any steam."

"It's just my way of thinkin' I guess," said Red. "You see this faucet here is at the upper end of this pipe (Fig. 1) and Valvy in connecting up didn't allow any pipe to extend past the faucet so there would be an air cushion to stop the rushing column of water (Fig. 2). Without a cushion of some sort there is that awful jarring action and a tendency for the water to force its way past the rubber ball in the faucet.

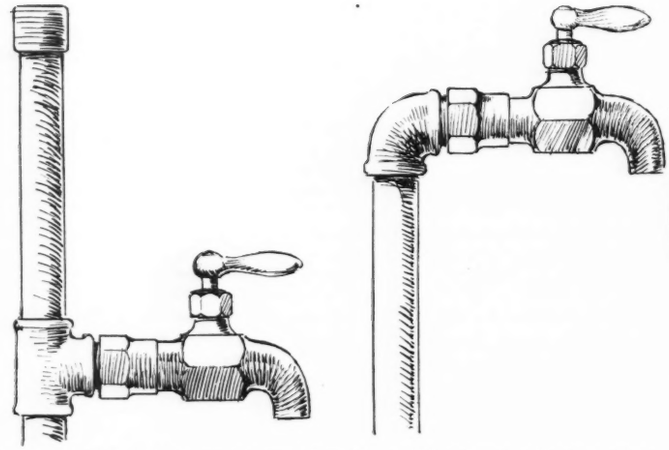
"This experience we are having with this piping is similar to the experience we would have if we tried to operate an ignition system without a condenser, which is a sort of electrical shock absorber, for the current when it flows in a magnetic circuit such as a coil around an iron core has a sort of momentum or inertia so that it does not want to stop when it gets to flowing.

Current Jumps the Gap

"For that reason in a simple ignition system (Fig. 3) the current will arc at the points, for when they start to open the current jumps the gap, just as the weight of the column of water tried to keep flowing when the faucet closed and raised an awful rumpus when it was unable to.

"You will remember that the last time we talked about ignition principles we found that the voltage generated in the secondary winding was produced by a change in magnetism and that the faster the change the greater the voltage. That's just where we get into trouble if we have no condenser, for the fact that the points arc shows that the current in the primary or magnetizing winding does not die out quickly. Then with slow drop in the primary current, there is a SLOW change in magnetism and a LOW voltage.

"That's why if a condenser is open or disconnected that the points burn so badly, and the spark is so thin and weak that it has no heat and usually fails to fire the gas



Right: Fig. 1—With no air cushion, the solid column of water stops with difficulty when the faucet is turned off, like an interrupter without a condenser. Left: Fig. 2—With the pipe extended above the faucet to form an air cushion, there is a shock absorber effect which compares to the action of a condenser in stopping the primary coil current when the interrupter points open.

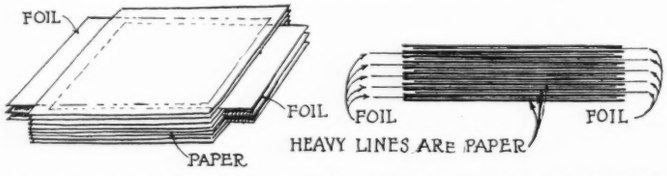


Fig. 5—Method of making a stacked condenser. One set of tinfoil sheets makes no connection with the other set.

in the cylinder. With a condenser in use (Fig. 4) there is a rush of current to charge the condenser, and this gives the points time to separate and break the current. Then the condenser charge rushes back in the form of a slight current, going the reverse way through the coil, which again helps to break down the magnetism and give a good sparking voltage."

Valvy had been listening in on the conversation and decided to butt in. "I took a condenser apart the other day. It was out of a Ford coil. There was just a lot of tinfoil and paper in it and I never did find a connection from one terminal to the other."

"Good reason," said Red. "That's because there is no connection."

"No connection?" Valvy wanted to know. "Then how does it work?"

Like Spring On the Car

"In our water pipe there would not have been a connection at the upper end of the air chamber (Fig. 2) either, and yet there would have been a cushioning effect. In the same way the insulation in the condenser acts like an elastic medium and takes the shock. We can also compare the condenser to the spring on a car. When the car hits a bump, the spring deflects, but the car does not travel through the spring and hit the axle, unless the spring breaks.

"In similar fashion the current does not travel through the condenser; it merely strains the insulation as the leaves of the spring were strained, and if the current ever does go right through, we say the condenser is shorted. This sometimes does happen and when it does the car stops for you get no ignition with a punctured or shorted condenser any more than you get spring action with a broken spring."

"And how are condensers made and tested?" Valvy wanted to know.

"One thing at a time," said Jake. "Suppose Red tells us how they are made first."

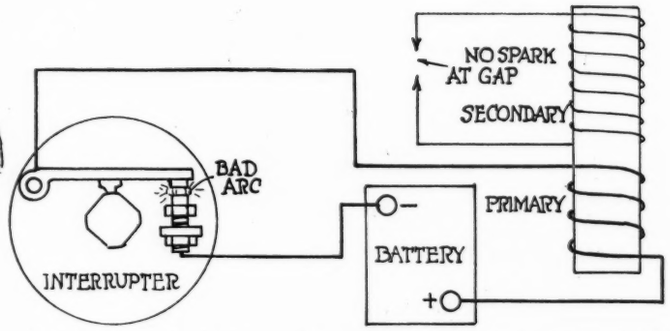


Fig. 3—A simple ignition system with the condenser omitted. The points would arc badly and there would be no spark at the gap.

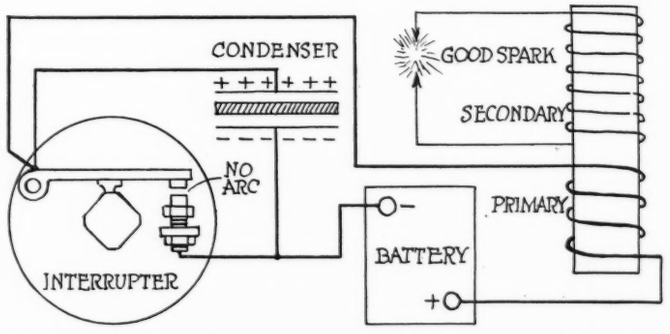


Fig. 4—With a condenser across the points, the rush of current through the coil is diverted to the condenser which it charges. This permits the points to open with little or no arcing, and the quick stopping of primary current produces a good spark at the gap.

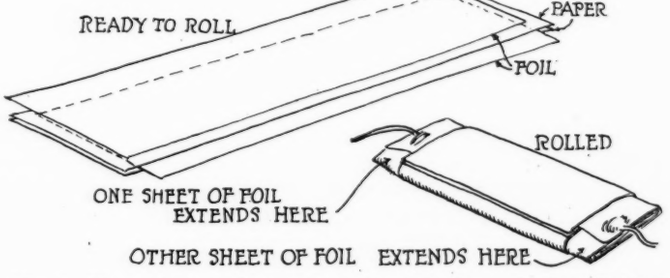


Fig. 6—The rolled condenser is easier to make and when finished looks like a small bolt of cloth. The two strips of foil in this type do not touch each other.

"Just as you say," said Red. "The ignition condensers are made two ways; some are stacked but most of them are rolled. In a stacked condenser, alternate layers of paper and tinfoil are used, but one piece of foil extends out over one edge of the paper, while the next piece extends out in the other direction (Fig. 5). When the job is finished the edges at one side are all soldered or sweated together in contact with one terminal while the same is true at the other side. If you had gloves on and then meshed the fingers of one hand with the fingers of the other, you would have the fingers of the two hands interlocked, but not touching due to the gloves. In similar fashion the two sets of tinfoil leaves mesh together but the paper keeps the two sets apart. In most condensers thin paper is used, two or three sheets being used in each layer of insulation. This is better than one thick piece of paper, for if any defects exist, they are not likely to lineup in the different layers.

"In the rolled condensers (Fig. 6) the idea is the same but long strips of paper and foil are used, there being two strips of foil, and as with the other type, one strip extends out from one side while the other extends in the opposite direction. Ford condensers for example are made in this way.

(*Continued on page* 39)

Getting the Car Ready to Paint

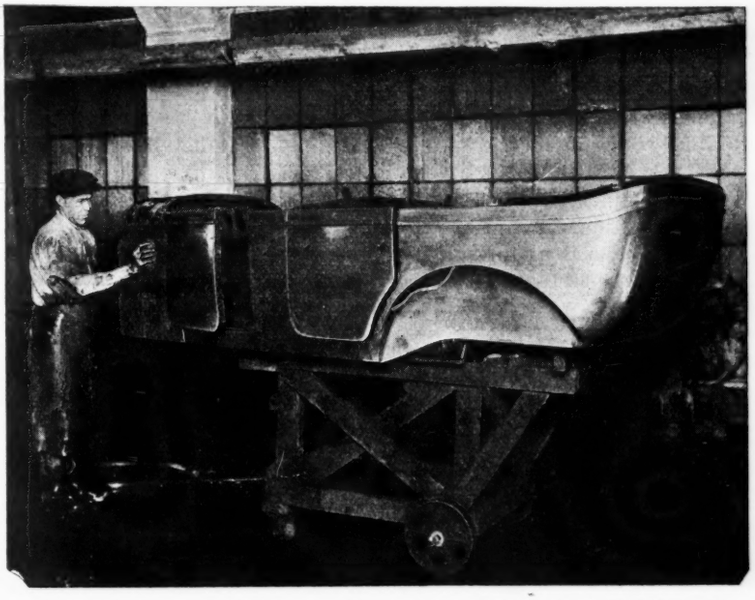
Problem Is Quite Complicated as It Involves Not Only Complete Removal of Dissimilar Materials, But Production of Surface Which Must Permanently Hold and Not Affect Applied Finish. Deoxidine Process Explained

By B. M. IKERT

IN preparing the body of a car for painting more things have to be taken into consideration than merely the matter of getting off the old finish. Simple as it may seem the problem is quite complicated, involving as it does not only a complete removal of many dissimilar materials, but the production of a surface which will permanently hold and have no effect on the applied finish.

In order to accomplish the above, whatever cleaner or process of cleaning is used must have the ability to dissolve rust, remove oil and solder solutions as well as other rust stimulators and to eliminate alkali. On top of this the cleaner or cleaning process must leave a surface which is clean and free from any tendency to change after the finishing materials have been applied.

Many shops doing automobile refinishing find the use of the Deoxidine process a big help in preparing cars for finishing. This process has been in use in production shops since 1914 and is especially desirable in conjunction with the pyroxylin finishes where it is absolutely necessary to remove the last traces of oil and to counteract any paint shedding property of the solvent or alkali materials that have been used to remove the old paint coats and which are not removed with a sand blast or some of the solvent cleaners generally used in the refinishing shops.



This illustration, made from a photo taken in the Nash plant, shows the application of Deoxidine. The process has been in use in production work for some time, but is readily adaptable to the small paint shop.

It must be remembered that in cleaning the surface with high test gasoline or benzine, any oils present on the surface are diluted in the solvent, but upon the evaporation of the cleaner these same oils are still present on the surface.

In the case of Deoxidine, the oil is not merely moved around from one spot to another but is completely removed in the washing operation, it is stated.

In addition to removing the oil, Deoxidine is said to counteract the rusting action of soldering acid and hand marks, even though these rust stimulators be invisible at the time the surface is cleaned, so that the process affords an adequate protection against the development of rust under the new finish, as it prevents the development of defects in the painted finish.

Briefly, the Deoxidine Process consists of the following steps:—

1. Applying the Deoxidine.
2. Allowing time for the Deoxidine to act and to drain.
3. Scrubbing the work with steel wool.
4. Washing the work with cold water.
5. Drying the work with cloths.
6. Air or oven-drying the work.
7. Final dry-wiping before priming.

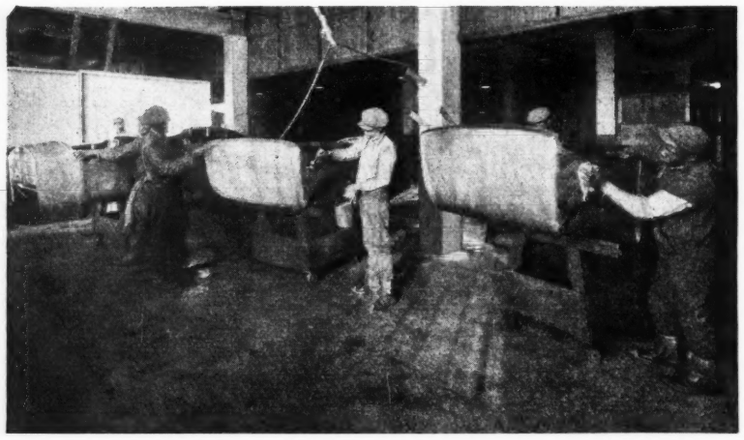
Each step is simple and can be easily learned by unskilled labor in a short time. Although simple, each step must be carefully performed according to the detailed description given below by the maker:

Step No. 1—Applying the Deoxidine. Apply the Deoxidine to the work with a brush. Do not brush the Deoxidine out like paint but flow it on like varnish, being sure that the entire surface is generously covered. Much of the Deoxidine will drip from the body. Economies can be effected by catching these drips as they are suitable for use again. The most practical receptacles for catching the drips are long throughs placed under the bodies. These should be constructed of wood, and be free from leaks.

Step No. 2—Allow Time for Deoxidine to Act.—Do not let the applied Deoxidine dry as it will be very difficult to remove. In the refinishing shops, after the Deoxidine has been applied to the entire body, the operator may immediately proceed to Step 3, as sufficient time will have elapsed for the Deoxidine to have accomplished the object of Step No. 2.

In most refinishing shops the Deoxidine Process will be carried out by one man and it will be found that in some cases, particularly on exceptionally heavy rust, that Deoxidine cannot be applied to the entire body before it dries on the parts where first applied, so that the process will be somewhat modified in that sections of the body will have the Deoxidine applied and before it dries will be washed off, as described in the subsequent steps.

Step No. 3—Scrubbing the Work with Steel Wool. While the Deoxidine is still wet on the surface, the panels should be hastily scrubbed with steel wool to bring the Deoxidine into intimate contact with the steel. On spots where heavy rust occurs or where soldering acid is known to



Applying Deoxidine to open bodies. One operator is applying it with a brush, the material being held in the can in the operator's hand.

exist, the scrubbing should be more thorough and, if necessary to the complete removal of rust, an extra application of Deoxidine should be made to these spots.

It would be advisable for the workmen to wear rubber gloves in this operation to protect the hands against splinters from the steel wool.

Step No. 4—Washing with Cold Water. While the Deoxidine is still wet on the surface, the body should be washed down with a liberal supply of cold water. Hot water should not be used at this stage as it sometimes causes the "setting up" of the Deoxidine which makes its removal difficult.

Usually a sponge and a hose are used in applying water to the surface although an open barrel and a sponge are entirely satisfactory. In any case, a liberal quantity of water should be brushed over the entire surface so that all traces of the cleaning materials and the waste product are removed.

Great care should be taken to thoroughly wash out behind the mouldings and in all crevices. A high pressure stream of water from a small nozzle, or a high pressure stream produced by partly closing the end of the hose, will suffice to remove from behind moulding and from crevices any of the product of the cleaning, and any waste materials that have lodged there. It is at this point that paint troubles usually develop and too much care cannot be exercised in thoroughly washing in the vicinity of the mouldings.

Care should also be taken that no brass or copper nozzles, or brass or copper fittings, touch the cleaned steel panel for they produce peculiar markings in the finish which are invisible until after the paint has been applied.

Step No. 5—Drying the Work with Cloths. After the work has been thoroughly washed as described, it should be dried as quickly as possible to avoid discoloration. This is accomplished by wiping with clean cotton cloths.

All of the moisture should be blown from behind mouldings and from crevices with a jet of air and that moisture which has been blown to the surface should be wiped up with clean cloths.

In the large production shops, in order to save time in drying, it is usual to blow a jet of steam over the panels before wiping the surface so that in absorbing the heat from the steam the panels will dry quickly. After the work has been thoroughly dried with cloths it is, in some cases, found advisable to actually heat the mouldings with a torch to expel any moisture that has remained there and it is considered good practice to dry the bodies in a heated oven for twenty or thirty minutes before applying the primer. This drying operation in an oven constitutes the Sixth Step.

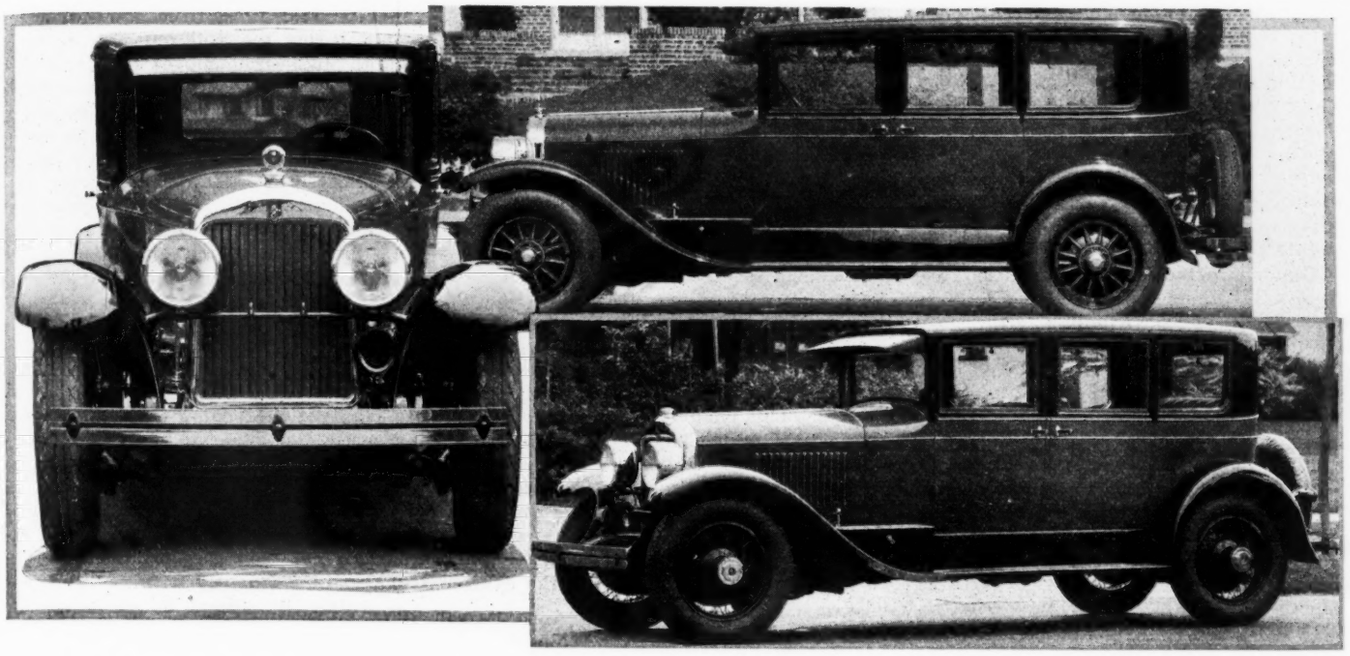
Step No. 7—Final Dry-Wiping Before Priming. After the work has been dried in the oven or in the air, it is inspected for any white deposits which may have been caused by water runs and if any have occurred they are removed by sanding with fine sand paper, used dry.

Great care should be exercised not to touch the work with the bare hands as perspiration at this stage may deposit on the surface chemicals that will produce rust.

All dust is now removed by wiping with clean, dry rags, or with a tack rag, and the primer should be immediately applied.

An article dealing with safety precautions necessary with pyroxylin finishes will appear in the next issue of MOTOR AGE.

Window display of Sterling P. Forrest, Jr., Sacramento, Cal., Chevrolet distributor.



At the left is shown a front view of the Cadillac 5-passenger sedan while the same model is shown at the right. Above is the 7-passenger sedan

Radically Different Car Is Found in New Cadillac Offering

While Product Bears Signs of Company's Past Practice Effect of Changes Presents Vastly Different Design

By W. L. CARVER

WITH the compensated crankshaft which has featured models of the last 2 years and the bore and stroke dimensions which have been characteristic since the original announcement of the eight cylinder V-type engine serving as the foundation, the Cadillac Motor Car Company now is producing an entirely new car. While the new product bears the earmarks of Cadillac construction, many new features have been incorporated as the result of a program of simplification and the utilization of recent engineering developments. The complete chassis weighs 250 lbs. less than its predecessor and of this amount, 130 lbs. have been removed from the engine. Semi-elliptic rear springs with ball-jointed rear shackles have replaced the former platform type. Two unit electrical equipment has supplanted the single unit generator and starter which have been used for more than 10 years. One timing chain is used instead of two and the generator and fan are belt driven. As the result of this arrangement, the valve actuating mechanism has been simplified and the intake manifold system has been improved materially. The starting motor is placed vertically near the back of the crankcase and drives the flywheel through a system of crown gearing.

Along with this program of mechanical revision which has resulted in a lighter car of more power and greater flexibility of performance, bodies have been improved by co-operation between the Cadillac engineers and the Fisher Body organization. Previous body lines have been followed but detailed refinements have resulted in a slight reduction in weight. In some instances doors have been made wider. The instrument board has been rearranged and its appearance enhanced by walnut panels. Bodies are divided into two classes which correspond to the two wheelbases in which the line is built. The standard line which is built on chassis of 132 in. wheelbase embraces the following body types with prices as indicated.

Five Passenger Brougham	**$2,995**
Two Passenger Coupe	**3,045**
Four Passenger Victoria	**3,095**
Five Passenger Sedan	**3,195**
Seven Passenger Imperial	**3,435**
Seven Passenger Sedan	**3,295**

Supplementing this standard line is the Cutom line which is built on a chassis of 138 in. wheelbase with the exception of the roadster priced at $3,250 which is on the 132 in. chassis. The balance of the Custom line with prices is made up as follows:

Roadster	**$3,250**
Seven Passenger Touring	**3,250**
Phaeton	**3,250**
Five Passenger Coupe	**4,000**
Five Passenger Sedan	**4,150**
Seven Passenger Suburban	**4,285**
Seven Passenger Imperial	**4,485**

Duco finish in three color schemes, blue, Waverly gray and Arizona gray is applied to the standard line. In the custom line, any color scheme is available upon 60 days notice although these bodies are produced regularly with Duco finish in six color schemes, all of which are in regular production. In addition to this range of finishes, the appearance of the entire line has been modified by new lines at the hood and radiator. While the curve over the top has been retained, the radii between this surface and the sides have been shortened and the latter slope outward toward the bottom. The new combination blends with present day body lines to better advantage and the appearance is further modified by the addition of vertical shutters in the nickle radiator shell. Drum type nickle head lamps and elliptical crowned fenders round out the distinctive appearance of the new models. Wood wheels with heavy spokes and low pressure tires of 33x6.75 dimensions are standard equipment although wire wheels are optional at additional cost.

Closed bodies are equipped uniformly with the Fisher one-piece ventilating windshield, an adjustable rear view mirror and an automatic windshield cleaner. The custom line is fitted with bumpers at the front and bumperettes at the rear in addition to a motometer and spring covers. To prevent drumming, the tops of all closed cars are constructed of 2 in. wide wood slats covered with padding and leather fabric. A variety of accessory equipment including such items as robe rails, smoking and vanity set is offered in the closed models. Windows in the standard line are operated by segment and pinion type mechanism while those in the custom line are operated by cable lifts. In the standard cars, the upholstery is mohair velvet while custom cars are trimmed to the buyer's specifications. The brougham being a two-door job has a door opening of 37 in.

While the new engine has a typical Cadillac appearance, closer inspection reveals a number of striking departures from previous practice. The crankshaft is substantially the same as that used for the past 2 years, although a trifle shorter, the decrease having been made at the outer ends as the result of better understanding of the benefits of the compensating counter weights which remove unbalanced loads from the bearings. For the same reason, connecting rod length has been reduced from 12 1/2 in. to 11 in. between centers. In view of the stroke of 5 1/8 in. it will be seen that the new length is still more than twice that of the stroke. The shorter rod brings about a substantial reduction in overall width of the engine and a material reduction in weight and has no effect on the smoothness and flexibility of operation as all inertia forces are opposed and then balanced out by the compensating weights on the crankshaft. In order to improve bearing conditions at the piston, the pins have been placed 9/16 in. farther down from the top, creating somewhat of a cross head effect with equal bearing value above and below the pin.

Two Unit Electrical Systems

With substitution of a two unit electrical systems for the former combined starter-generator unit, a great number of changes making for greater simplicity and accessibility and better operation followed. The new generator is flange mounted at the top of the timing case and driven at about twice crankshaft speed by a heavy rubber V-belt from a pulley mounted on the front end of the camshaft. The fan is mounted on the forward end of the generator shaft and has six blades with a dia. of 21 in. The first result of this change is the elimination of the friction clutch at the fan and of greater importance, the elimination of one chain from the timing train. Along with this, the complicated chain adjusting assembly at the front end of the camshaft has been dropped.

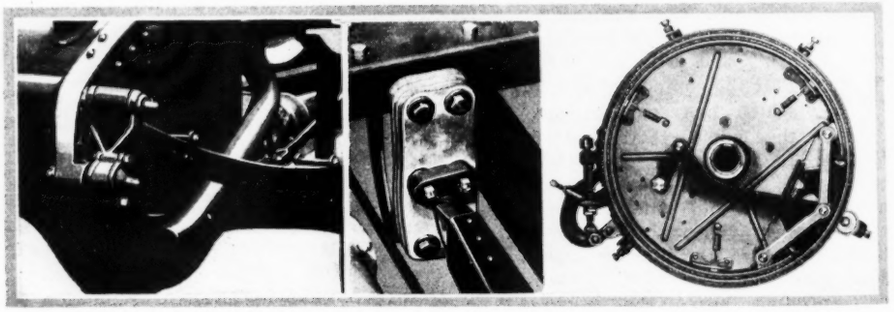
In the new layout a single Morse chain is used to drive the camshaft and its tension is regulated by a spring actuated idler which is located in the right half of the timing case. Chain of the plain pin type is used instead of the former split pin type but the quietness has been improved by using a chain of finer pitch. Another product of this revision is the substitution of a simple pressed steel timing gear cover of 3/16 in. thickness for the complicated aluminum casting assembly. With the elimination of the universal shaft which extended the full length of the trough between the cylinder blocks to drive the generator it has been possible to clean up this portion of the engine. The carbureter has been dropped to eliminate tortuous bends in the intake passage and improve the heating conditions in the incoming gas stream. This change in conjunction with the adoption of dome type combustion chambers which induce turbulence has increased power output and improved the flexibility of performance. The overflow passage for the carbureter now passes down through the crankcase instead of being piped around the end of the cylinder.

In conjunction with the change of carbureter location, the branch intake manifolds for each of the cylinder blocks have been removed from the cylinder blocks and now are cast separately and enamelled on both inner and outer surfaces. Because of the additional room in the trough, roller tappets operating directly on the cams have replaced the former tappet levers. These tappets are drilled and subsequently hot-formed so that they are not only extremely light but have substantial sections and great strength at points of high stress. The tappet is restrained from rotation which would throw the roll out of line by a lateral plug which moves in a broached slot. This feature is utilized to simplify tappet adjustment. The adjusting screw is threaded into the top end of the tappet which is split and equipped with a lateral clamping screw. Therefore during tappet adjustment, it is not necessary to restrain any part or manipulate a lock nut. The adjusting screw is set to the proper clearance and then is in no way affected by the locking action.

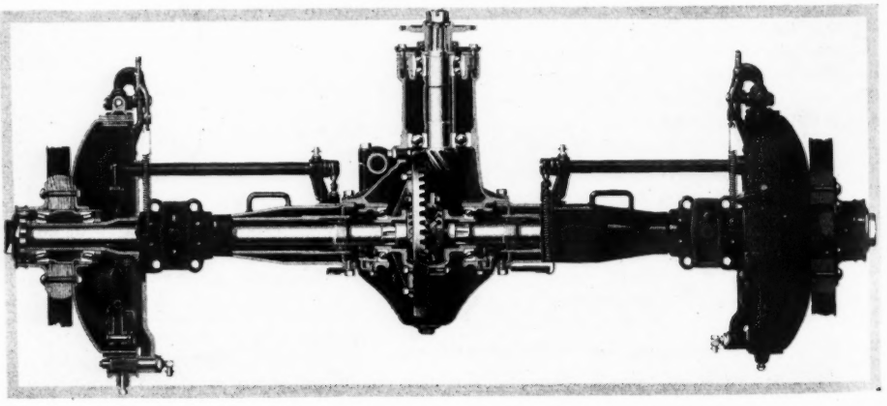
Striking Change at Front

The space between the blocks is remarkably clean. The carbureter is in the plane of the center crankshaft bearing while the generator is clear of the front valve housing covers. The distributer head which is Delco, as are the generator and starting motor, is driven by helical gears from the rear end of the camshaft and therefore is outside of the trough. Consequently nothing interferes with valve adjustment or access to the various parts of the carbureter. The ignition head is fitted with two four lobed cams and two breaker arms which permit correct operation at higher speeds.

At the front end another set of striking changes is visible. Where the cross shaft formerly drove two water pumps, one at each side of the block, one of these, that at the right side has been eliminated and has been replaced by the oil pump which is transferred from the front end of the crankshaft. The water pump on the left side has been made much larger and has a capacity greater than both of the pre-



At the left is shown the rear end of the Cadillac frame. The shackle has a ball mounting at the lower end; Center, fabric connection of torque arm; Right, toggle arrangement of emergency brake



Cross section of Cadillac rear axle showing the new bearing arrangement and concave brake drums which clear low pressure tires

vious pumps combined. A single connection joins the pump with the lower tank of the radiator. The outlet connection which is rubber hose extends back along the left side and the stream is divided so that half goes up through the left block and the other half is lead through the crankcase by means of a cast-in copper pipe to an elbow which connects with the lower portion of the right cylinder block. Each block is connected to the top tank of the radiator by a rubber hose although it is not necessary to break the hose connections in service work as flanged elbows equipped with gaskets are bolted to the top of each cylinder head.

Vertical shutters thermostatically operated have been installed in front of the radiator core, which is cellular, in place of the former fin and tube construction. These shutters with their thermostatic control replace the heat control system installed in the water lines. The radiator shell is stamped from nickle instead of being plated brass or steel. The carrier bars for the shutters and the bearing pins at the ends of these parts have been given a rust proof treatment.

Over-Running Clutch

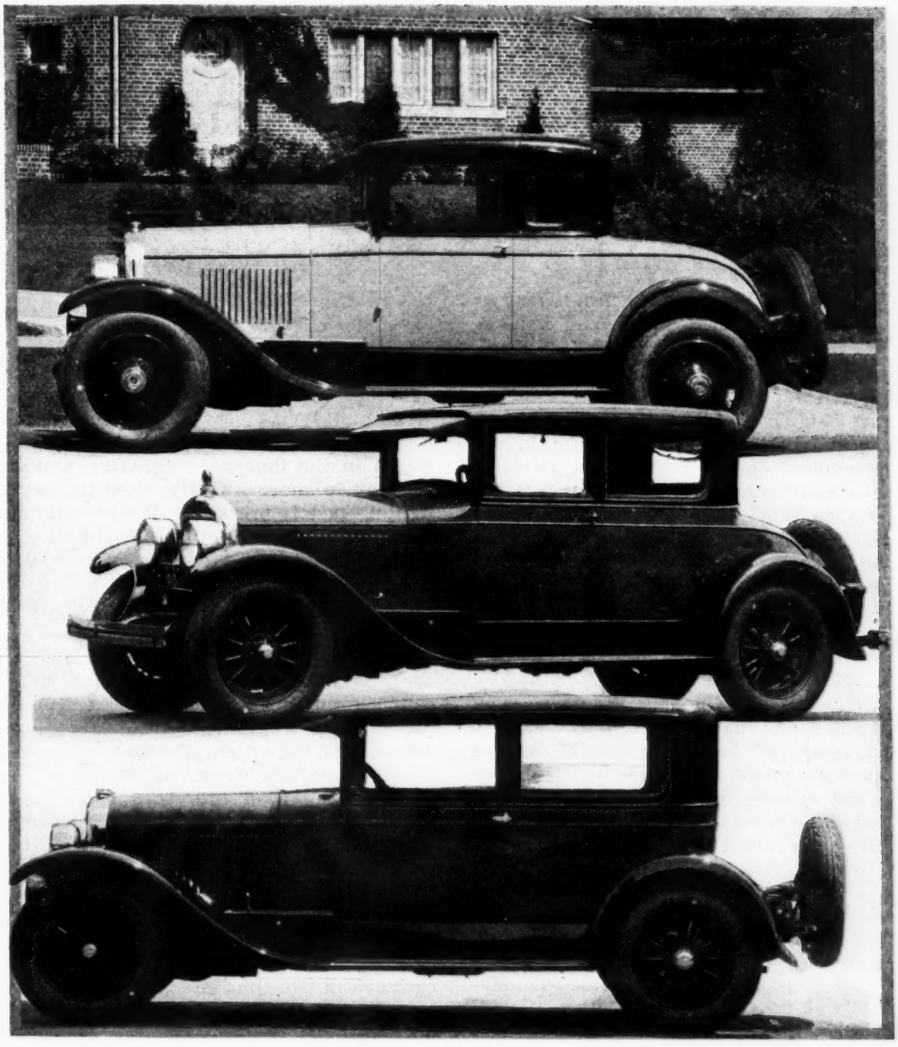
The starting motor is mounted vertically on the flywheel housing. A spur pinion at the lower end of the starter shaft is engaged with crown gear teeth cut on the back of the steel flywheel ring by the usual foot pedal on the toe boards. The first portion of the pedal travel advances the pinion into mesh with the flywheel gear while the last portion depresses the ignition switch. An over-running clutch interposed between the pinion and the starter shaft allows the pinion to overrun as the engine starts and complete disengagement occurs when the starter pedal is released.

The former pressure pump for the fuel line which was operated at the front end of the camshaft by an eccentric and strap has been placed just abead of the left cylinder block and its plunger is operated directly by an additional cam which is located ahead of those for No. 1 cylinder.

The oil level gage has been placed on the right side of the crankcase instead of in the trough between the cylinders and the screw type filler cap which closes tightly, extends diagonally from the right side of the timing gear case.

Within the crankcase, six bearings support the camshaft instead of the former five and all of these are pressure lubricated. Incidentally, the tappets are fitted with lateral holes into which pins may be inserted so that these parts may be held up out of the way to allow the withdrawal of the camshaft while the engine is in place in the chassis. The rear crankshaft bearing has been shortened while the front has been lengthened although the center bearing remains unchanged. The dia. of all three continues at 2 3/8 in. Main bearing caps are of deep section aluminum alloy eliminating the former auxiliary steel plates. Instead of through bolts, studs are used to secure the main bearing caps.

One of the outstanding features of the new engine design is the crankcase ventilating system which prevents the water and sulphur products of combustion from descending into the oil reservoir.



Top, Cadillac standard 2-passenger coupe, Center—Custom 5-passenger coupe and below the 5-passenger Brougham

This feature is based on the fact that the two plane compensated crankshaft acts as the impeller of a centrifugal pump and given the correct conditions of air circulation, will build up a pressure greater than atmospheric in adjacent air spaces. Therefore the design is arranged so the breather just back of the water line elbow on the left side of the engine serves as an air intake. The breather opening on the right side has been closed and the oil filler is closed by a screw cap. Following these holes have been drilled in the skirts of the pistons and those engage with holes drilled in the inner sides of the cylinder walls at the bottom of the stroke. The holes in the cylinder walls are the outlets of the air pump system.

As the pistons are fitted with relief holes at the lower ring grooves the products of combustion will seep through at this point. They are forced down by the pressure of combustion above and opposed by pressure greater than atmospheric which is produced by the crankshaft's rotation. At this stage, it must be remembered that these products are membered that these products are vapors vapors rather than liquids. Due to the pressure below, the only path for these vapors is out through the vent holes in the cylinder walls. These holes communicate with the valve housings which are closed by plates. The final outlet from each side is at a hole drilled well up in the rear wall of the valve housing enclosure. From this point elbows and lengths of metallic hose conduct the vapors down below the body of the car.

Special Valve Stem Lubrication

With this system, the valve gear housings are not vented with the crankcase as is usual but have only small drilled drain holes which allow any surplus accumulation of oil to drain back into the crankcase proper. Due to this arrangement, special provisions are made for the lubrication of the valve stems. Small semicircular grooves are cut in the piston lands between the second and third ring grooves from the top. Naturally oil collects in these grooves and as they pass small holes which are drilled in the cylinder walls to communicate with the valve gear chambers, is blown through in a spray.

As mentioned previously, the oil pump

(Continued on Page 36)

Several Mechanical Changes and Body Refinements in Buick Models

Company Announces Price Reduction on All Cars in Both Special Six and Master Six Lines—Engine Size Increased

By LESLIE S. GILLETTE

RETAINING the essential features which have characterized the Buick cars of late, the 1926 Standard and Master Six models, in addition to marked improvements in general appearance, embody several important refinements, making for more durable and economical operation, superior performance and increased driving comfort.

Concurrent with the introduction of the new series, The Buick Motor Company has reduced prices on all models, ranging from $25 to $370 on the Standard Six, and from $100 to $430 on the Master Six, with the exception of the Master No. 47 sedan which has been cut $730.

Sixteen body models in new color schemes and having mouldings extending from the improved design radiator entirely around the body, which on the closed models accentuates the popular double belt effect, comprise the new line. The prices are announced as:

STANDARD SIX

No. 24	2-pass. Roadster	$1125
" 25	5-pass. Touring	1150
" 20	5-pass. Sedan 2-d	1195
" 26	2-pass. Coupe	1195
" 28	4-pass. Coupe	1275
" 27	5-pass. Sedan 4-d	1295

MASTER SIX, 120 IN. W. B.

No. 44	2-pass. Roadster	1250
" 45	5-pass. Touring	1295
" 40	5-pass. Sedan 2-d	1395
" 47	5-pass. Sedan 4-d	1495

MASTER SIX, 128 IN. W. B.

No. 54	4 pass. Sp. Roadster	1495
" 55	5-pass. Sp. Touring	1525
" 54C	3-5 Pass. Country C. Coupe	1765
" 48	4-pass. Coupe	1795
" 51	5-pass. Brougham Sedan	1925
" 50	7-pass. Sedan	1995

As compared with the previous models, the price differential now existing between the regular touring and the four-door sedan is $145 instead of $490 on the Standard Six chassis, $200 instead of $830 on the 120 in. Master Six chassis and $400 instead of $6125 on 128 in. Master Six chassis.

Chief among the mechanical changes on the engine and chassis of both models are the increasing of the cylinder bores by ⅛ in., so that the Standard Six now measures 3⅛ in. in diameter and the Master Six 3½ in., the fitting of an oil filter, air cleaner and gasoline strainer, and the adoption of an improved Delco two-unit electrical system in place of the former single unit type.

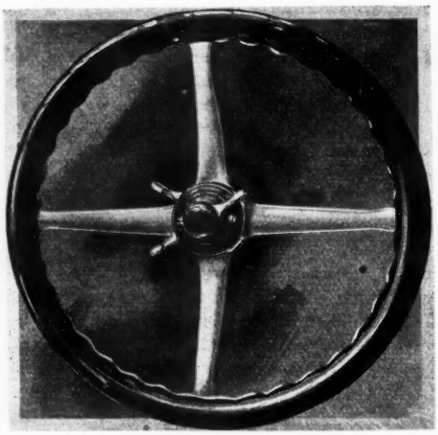
To give ample capacity for the increased power of the engine, the clutch, while retaining the basic principles of the previous type, has been entirely redesigned. The transmission case has been made more rigid and all gear teeth increased in width, while several changes affecting the axle sizes, bearing dimensions and spring seats are made on the rear axles. In addition to slight refinements in the four-wheel braking system to provide more effective braking with lighter pedal pressure, larger section tires, 31 by 5.25 in. on the Standard Six and 33 by 6.00 in. on the Master Six chassis are provided.

In harmony with the improvements made in the appearance of the bodies, the radiator shell while maintaining the characteristic Buick design, has been rounded out in the front by ½ in., allowing the use of larger radius at the corners. Greater length has been emphasized at the front of all cars by pressing the bead into the shroud and finishing it in the same color. Formerly a strip of aluminum beading marked the joining of the hood with the cowling. The Duco finish is in new attractive colors with suitable striping and black moulding. On the Master Six chassis, two of the closed models and both sport cars are in two-tone effect, the latter two being offered with two color options at no additional cost.

With the exception of both sport models on the Master Six chassis, all open cars are now provided with permanent tops having a strip extending along the inside edge which allows closer fitting of the side curtains and the installation of winter enclosures, the latter being available at extra cost.

Straighter roof lines and smaller radii used at the rear corners identify the Fisher closed cars. On the Master Six models, the height of the roofs has been lowered by 1⅜ in. although there has been no reduction in the amount of headroom. In addition to the "VV" type windshields having an improved rubber water seal and increased width of the rear windows, all bodies on both chassis are fitted with the remote type of door latch control, the operating handle being located several inches below the glass and in approximately the center of the door. The door pull fittings are integral with the garnish mouldings while exterior bar type handles of new design and more easily operated are employed. A special feature on the coupes and roadster models is the spring hinges which open the rear deck when the key is turned, the latter also fitting the transmission lock and on the closed models, the doors.

Headlamps of new type allowing raising or lowering of the light beams for general or traffic driving and controlled by a lever at the center of the steering wheel, are provided on the new cars.



Details of the steering wheel now used on the Buick models

Enlarged Cylinder Bores

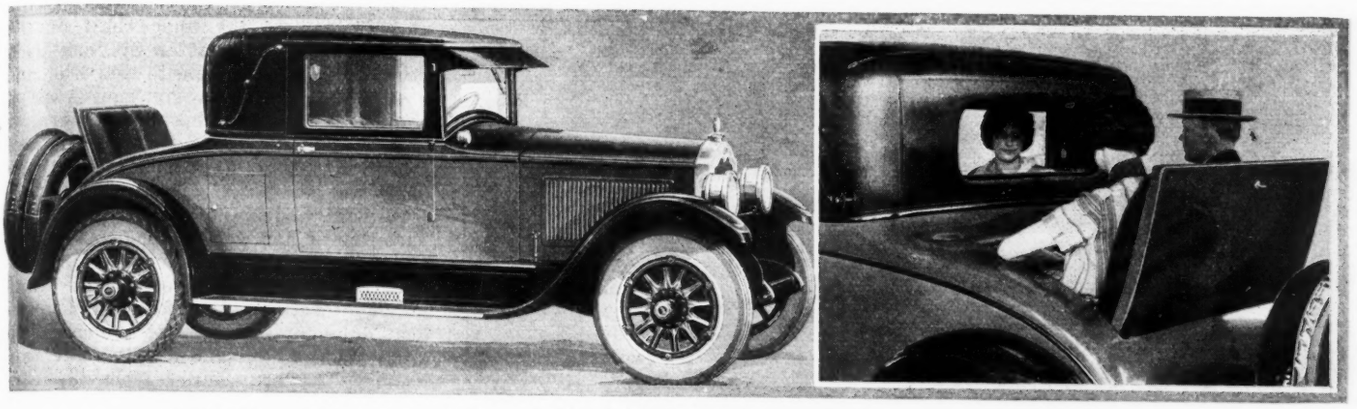
Bulbs employing two filaments, each being of the same candlepower, special lenses and reflectors are used in the new lamps. Although the bulbs are so designed that they cannot be assembled in the wrong manner in the headlamps, a regular standard bulb providing only "bright" light may be used if bulbs of the two-filament type are not available for replacement. To eliminate the necessity of left and right headlamps and to simplify adjustments, the lamps are mounted at the center of their base on the reinforced channel extending across the front of the car. An outside focusing device and improvements in the door mounting are included in the new lamps.

Enlarging the cylinder bores by ⅛ in. and improved carburetion has increased the horsepower from 51 to 60 at 2800 r.p.m. on the Standard Six engines and from 65 to 76 also at 2800 r.p.m. on the Master Six, while the maximum torque of the smaller engine is now 141 ft. lbs. instead of 120 and on the larger powerplant is 179 ft. lbs. instead of 160.

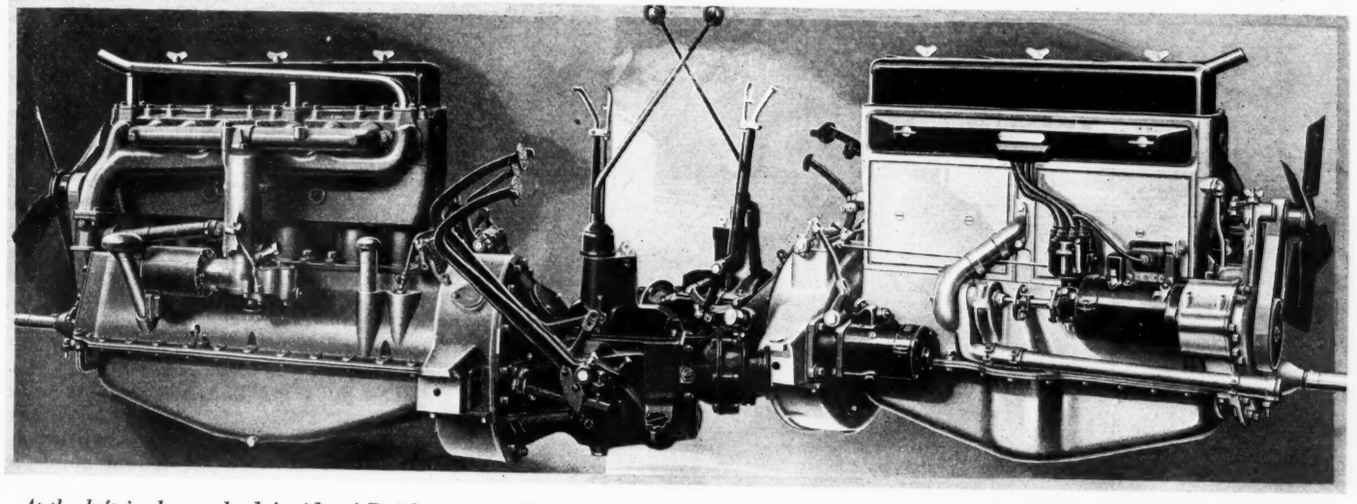
As the water pump no longer has to drive the former single unit type electrical system, a smaller case-hardened shaft, ground to reduce wear, is used while one packing gland only is now necessary. Driven through two universal joints from the end of the generator, the pump is mounted on a rigid bracket integral with the upper half of the crankcase.

Providing oil grooves to the outside diameter of the valve lifters which feed lubricant through an oil hole in the wall of the lifter, increasing the width of the valve rollers from ⅜ in. to $\frac{7}{16}$ in., using

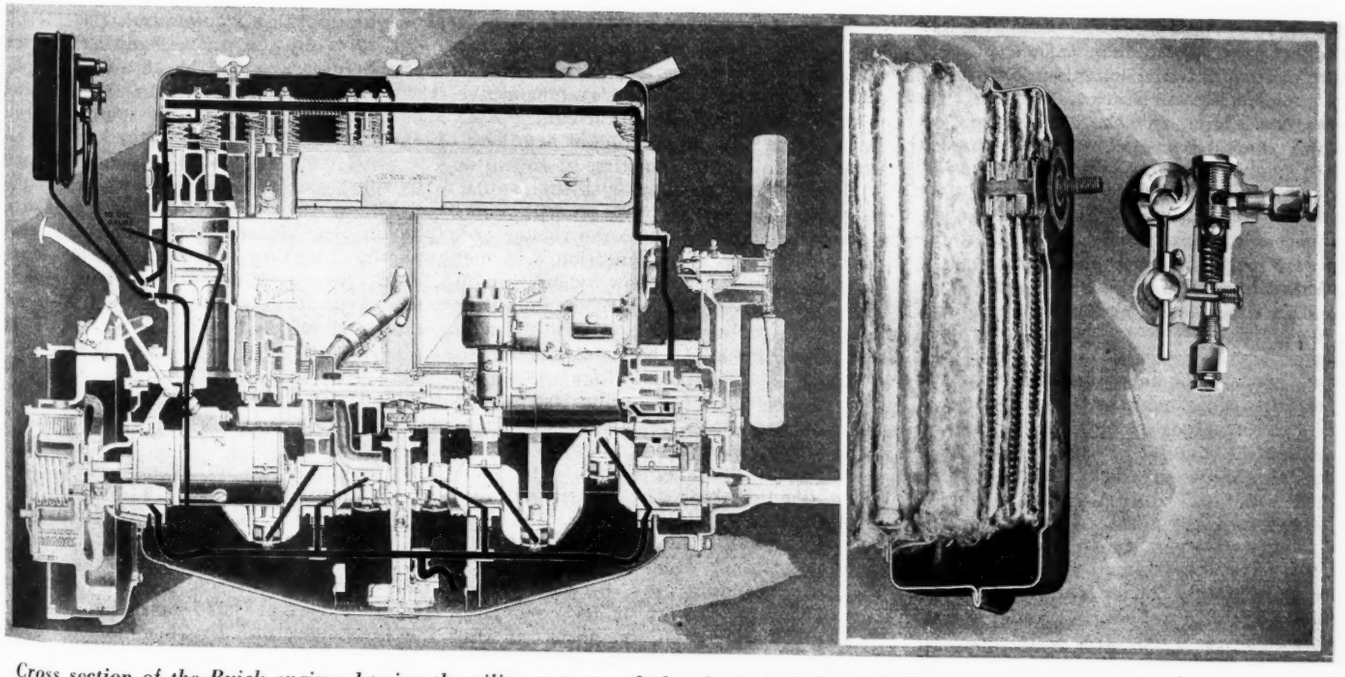
Some Views Showing Buick Changes



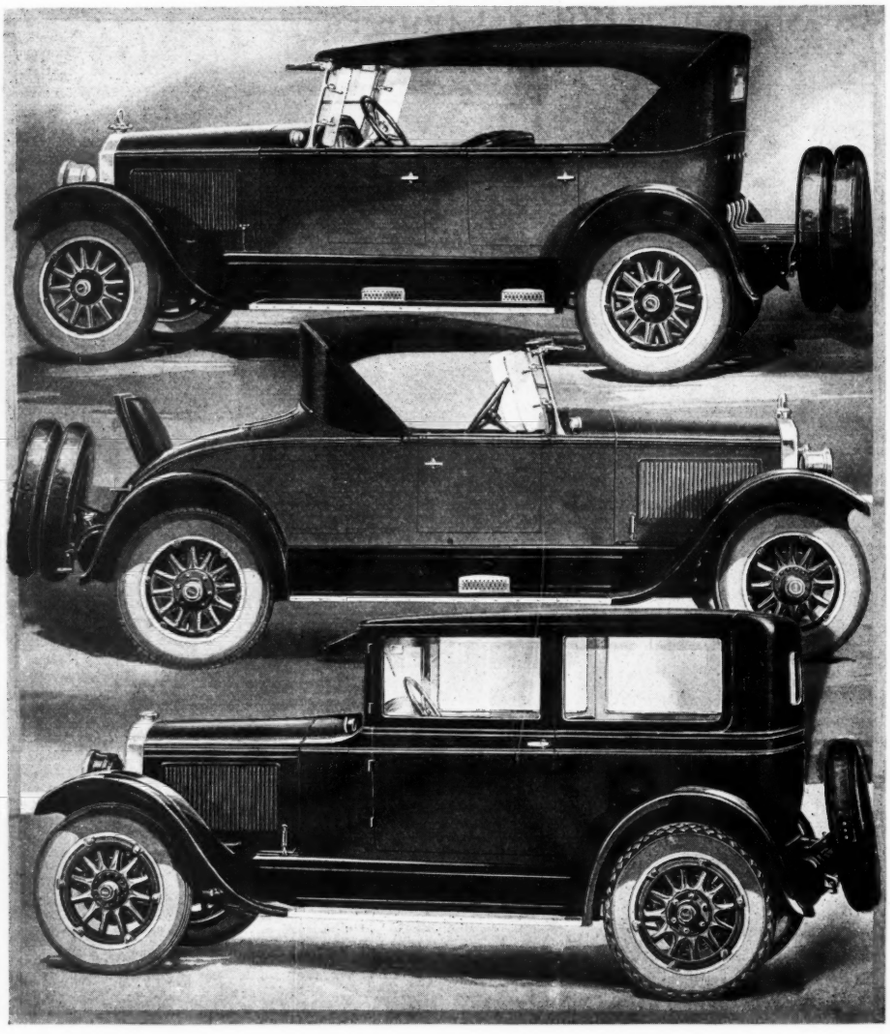
Buick Master Six Country Club model showing theaccommodations provided for passengers in the rear



At the left is shown the left side of Buick engine with air cleaner; right: Right side of Buick engine showing double-unit electrical system



Cross section of the Buick engine showing the oiling system and also the layout of the oil-filtering method. Right: Sectional view of oil filtering device



Buick Master Six Models. Top to bottom: 4-passenger Sport Touring; 2-passenger Sport Roadster, and 2-door Sedan

a small radius on the corner of the roller, adding four solid coils at the bottom of the valve springs and case-hardening the rocker arm shafts, has insured longer life of the valve mechanism. Made of 25 per cent heavier stock so as to provide greater rigidity and thereby prevent oil leaks, the push rod covers are provided with copper-asbestos washers under the cover screws as a further guard against possible oil leakage. To provide sufficient cooling for the larger engines, the fan on the Standard Six has been increased in diameter from 16 in. to 17 in. and on the Master model the fan blades are considerably wider, while to provide better ventilation, the engine side pans have been made deeper at the rear. In line with these changes, the diameter of the exhaust pipes on both models are increased in diameter, the pipe of the smaller engine now being 2 in. and the larger 2¼ in., while the inner tube of the mufflers are made in one piece and with one seam for greater strength.

Virtually everything has been done to prevent foreign matter entering the engines from any source and several thousands of miles are claimed to be added to the life of the engines by the fitting of an oil filter, air cleaner and gasoline strainer. Mounted on the dash above the right side of the engine, the oil filter consists of filtering cloths and metal screens carried inside a metal case and at car speeds over 20 m.h.p. all the oil in the crankcase is cleaned every 5 min. Taken from the oil system at the rear of the engine, the lubricant passes through the filter to the rocker arm bearings. The possible clogging of the filter will in no way interfere with the regular oiling system as a by-pass will automatically direct the oil to the rocker arm bearings under this condition. A pet cock is provided to show when the oil flow indicates the interior of the filter should be replaced with a new filtering cartridge, the latter being obtainable at nominal cost. A centrifugal type air cleaner having no wearing parts and fitted with a small detachable dust container is connected directly with the carbureter. Provided with a detachable glass bowl making the water and dirt accumulation plainly visible, the fuel passes through a metallic screen in the gasoline strainer which is placed directly below the vacuum tank, between it and the carbureter. To provide more positive lubrication and to assist in the filtration, the Standard Six oil pump has been changed to provide increased pressure. Pipes from the main bearings are enlarged in diameter from ⅜ in. to ½ in. and the relief valve altered to the same design as that on the Master model.

Coinciding with the design of the smaller engine, the upper half of the crankcase on the Master Six has been changed from aluminum to cast iron and a separate detachable flywheel housing having the engine arms cast integral is employed on the new model. This design allows more rigid support for the crankshaft and makes for easier servicing.

On both models, new calibration of the carbureters and several changes in the dimensions of the interior passages, valves and jets have been made while minor alterations are incorporated in the heat damper and dash pot plunger. To allow better installation of the air cleaner, the heat outlet from the carbureter is now located in the lower part of the riser body making it unnecessary to disturb the heat pipe when removing the carbureter from the riser. On the larger engine, the diameter of the intake manifold has been increased from 1⅜ in. to $1\frac{7}{16}$ in.

Starters Interchangeable

Supplanting the single-unit type generator-starter which has been a Buick feature for over 10 years, the new models are equipped with a specially developed two-unit Delco electrical system. Starters on both models are interchangeable as are the generators, the former being located in an accessible position on the right side of the engine and the latter being driven by the timing gears and mounted on the same side as the starter.

The starting motor, known by model designation No. 316 is of the positive mechanical type. Pressing down on the starter pedal which is mounted on the top of the flywheel housing, pushes the gears into mesh with the teeth on the flywheel before the current in introduced. After the gears are in mesh, a contact is formed with the switch on the starting motor, this completing the circuit and providing a fast cranking of the engine and a quick break-away torque. An over-running clutch in the starting gear assembly allows the motor to run ahead when the engine starts. Cut on a steel ring which is shrunk on the flywheel and secured by dowel pins, the teeth on the starter flywheel gear are chamfered for easy and silent engagement. To allow for easy service work in the event of the starter teeth being damaged, it is possible to pry the old ring gear off the flywheel after the dowel pins have been drilled out. Incorporating simplified leverages, the starting pinion can in an emergency be pulled back out of mesh with the flywheel in the event of a jam, by pulling backwards on the starter pedal.

Smaller and lighter in weight than used on previous models, the generator carries the ignition distributor directly over the rear armature bearing. The weatherproof distributor coil and the cut-out relay are also carried on the top of the generator. Brush mountings have been improved to eliminate squeaks and the commutator and brushes have been designed so as to have much longer life.

The model designation of the generator is No. 317 while the combination switch on the Standard Six is known as No. 1259 and the Master Switch No. 1288.

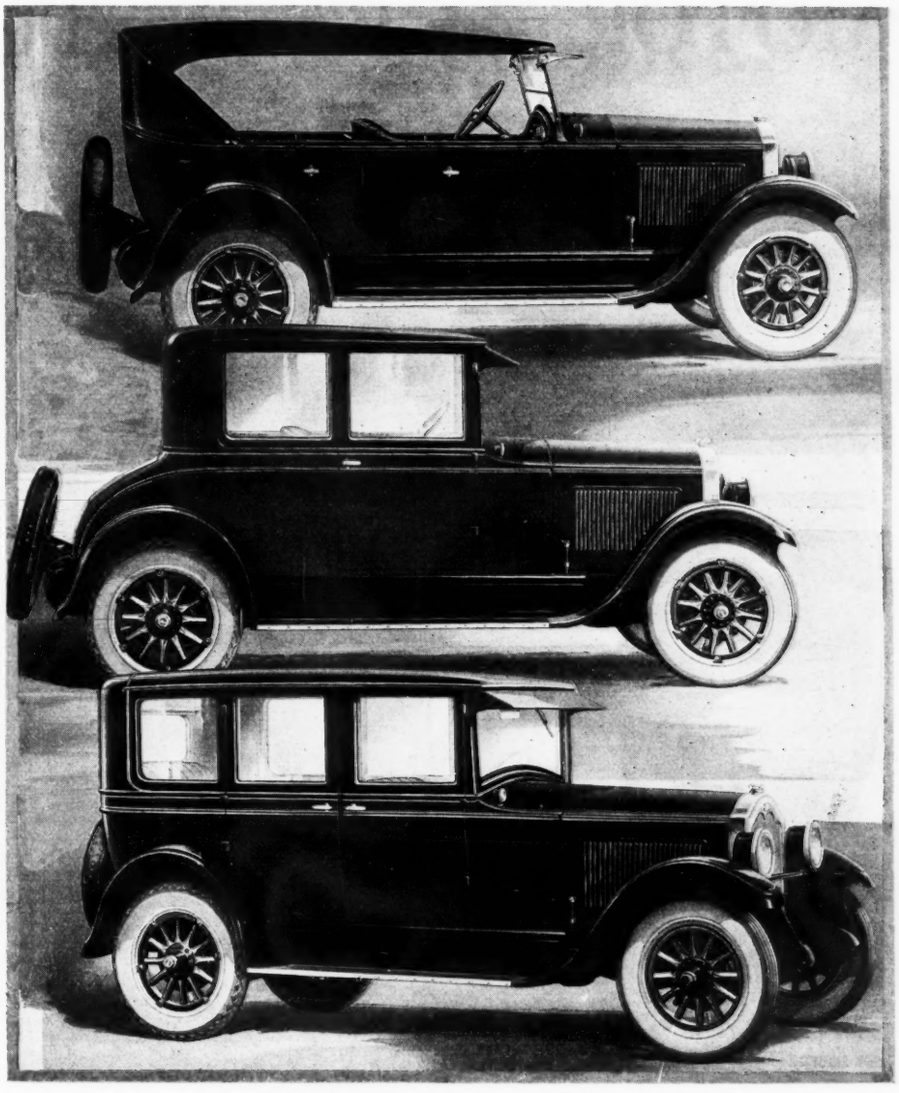
Clutch Redesigned

The multiple dry-disk clutch has been entirely redesigned insuring better balance, smoother operation and longer life and is carried in a special flange on the flywheel itself. In place of a bronze bushing, a New Departure ball bearing packed in grease and sealed, and located in the rear end of the crankshaft now carries the forward end of the clutch shaft, helping in the alignment and fitting of the clutch shaft. Driven through the teeth cut in the outer diameter which mesh with teeth cut in a special flange on the flywheel, the drive disks provide over 200 per cent more wearing surface at this point than on previous models. The driven disks being made from special high-carbon steel have the teeth cut on the inner diameter and working with the teeth on the clutch hub give considerably more wearing surface than before. Clutches on both models employ ten facings developed of special material and having larger outside diameter and wider face to give longer life. On the smaller car, these facings are ⅛ in. thick and on the larger edition 5/32 in. thick. Made of heat treated high carbon steel, the clutch hub is splined for both the clutch shaft and for the driven disks. The rear clutch plate and release spring carrier are now made of one piece to prevent oil leakage into the clutch.

Bolted to the flywheel housing, the transmission case has been made more rigid and the hand inspection hole reduced in size to increase the strength of the unit. By using different steel and heat treatment, the transmission gears are increased in hardness and toughness, and by widening the face of the gears. strength and longer wearing surface has been added. An oil baffle cast in the transmission case cover, eliminates the possibility of oil leaking past the control lever opening. Offsetting the hand brake lever forward and raising the control lever ball to a more accessible position, allows the right forward seat on the two-door sedans to be folded all the way forward. For easier operation, the clutch pedal is 1 in. longer than previously.

Considerable difference exists in the changes which have been made on the rear axles of the two cars. The axle shafts on the three-quarter floating Standard Six axle have been increased in diameter for strength, while the inner ends of these shafts are splined instead of square to insure a better fit between the shaft and differential side gear. To reduce the tendency to whip at high speed, the long portion of the pinion shaft has been increased in diameter, while the size and capacity of the bearings carrying this shaft have also correspondingly been increased.

New Departure, single row type, replace the former double row bearings carrying the rear wheels on the Master Six full floating rear axles. On the 120 in. wheelbase chassis only, the differential bearings have been increased in size, corresponding with those employed on the 128 in. chassis. The pinion bearing is also larger. Although the dimensions of the axle shafts remain unchanged, additional strength has been secured by forming the shafts of manganese instead of carbon steel previously employed.



Three of the Buick Standard Six Models. Top to bottom: 5-passenger touring; 4-passenger Coupe and 5-passenger Sedan

Common to both axles, the spring seats are changed to use a drop forged hardened steel thrust block providing two and one-half times more wearing surface on each side. Grit and dirt has been eliminated from this point by grinding the contact surfaces enabling a closer fit to be made and insuring longer life thereby. For convenience in raising the rear wheel from the ground, the jack rest construction has been altered to allow a greater purchase and eliminate the possibility of the jack slipping.

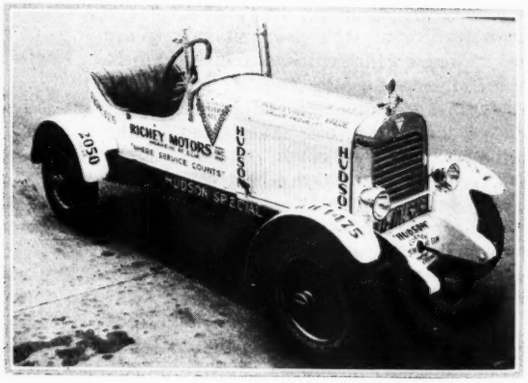
Four-wheel external contracting brakes are the same design and principle as used on the previous model except that the operating mechanism at the bands is reversed. This arrangement gives more effective braking with lighter pedal pressure and allows one long piece of brake lining to be used on each drum. Due to the fulcrum of the brake operating mechanism now being at the long end of the band, the latter moves in the same direction as the drum while the car is traveling ahead and the brake pedal is operated. This increases the efficiency of the brakes, as the rotation of the drum helps to set the brakes, making them easier to operate and reducing the tendency to squeak. With this design, the wear on the facings is the same at the brake anchor as at the ends of the band and filling in the space with brake lining under the anchor clips has added 41 sq. ins. of extra breaking surface. One brake lever pin instead of two is used in the operating brake lever at the brake end, while the adjustment for the band clearance is simplified. By using a nut at each end of the brake adjusting, each nut controls the clearance for its end of the band independently of the other end.

Shields fastened to the brake drum disks with screws, cover the inner edge of the brake drums and bands, preventing water and dirt thrown up from the wheels entering between the lining and the drum. Another shield performing similar duty is part of the band clips and covers the space be-

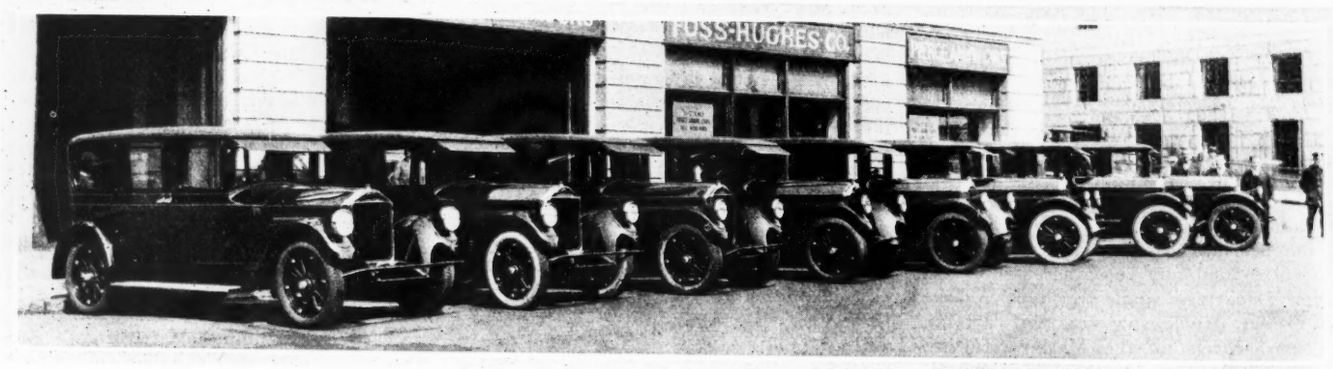
(Continued on Page 37)

MOTOR AGE'S PICTURE PAGES

BATTER UP. Captain Eddie V. Rickenbacker, American ace, and vice-president and director of sales of the Rickenbacker Motor Co., was photographed while watching a ball game in Buffalo surrounded by kids who were witnessing the game "free fer nothin'" as guests of the Buffalo Evening News. The interest on the faces of the spectators seems to indicate a crucial situation in the progress of the contest. This looks like a case where an Ace has become a King



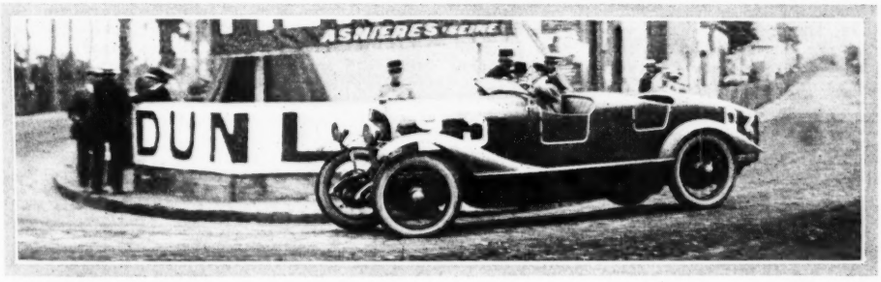
AUTOMOTIVE "COPY." This miniature Hudson, used by the Richey Motors, Inc., Hudson and Essex dealers at Long Beach, Cal., for advertising purposes, was built in the company's own shops



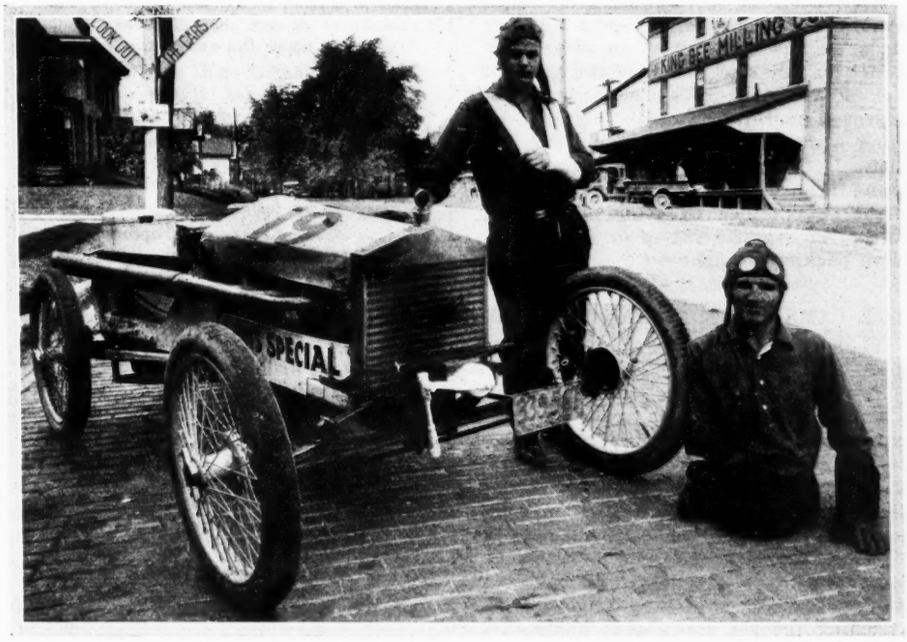
DE LUXE SERVICE. A fleet of eight Series 80 Pierce-Arrow Enclosed Drive Limousines is used by the 7700 Taxicab Co. of Wilmington, Del., for private taxicab and funeral work. Foss-Hughes Co. of Philadelphia, made the sale

OF AUTOMOTIVE INTEREST

READY FOR A SPIN. Miss Billie Dove, screen star, is shown beside a Studebaker Special Six Duplex-Phaeton in Hollywood



HAIRPIN TURN. It is located on the Le Mans, France, course and a car is shown negotiating it during the 24-hour race for the Rudge-Whitworth cup. The bystanders don't appear to be much concerned about it, but it is easily conceivable that such a turn could make one's hair stand on end



THE SPIRIT THAT WINS. Andy Crumshaw, Alliance (Ohio) newsdealer, born without legs and only one arm, is a successful automobile racer. He refused to become a public ward, acquired a news stand business and as a diversion has learned to drive automobiles in race meets. Special adjustments on the car make this possible. He is shown with his mechanic

The READERS' CLEARING HOUSE

Questions and Answers on Dealers' Problems

BUILDING ▲ ELECTRICAL ▲ FLAT RATES
SHOP ▲ LEGAL ▲ PAINT & TRIM ▲ ACCOUNTING

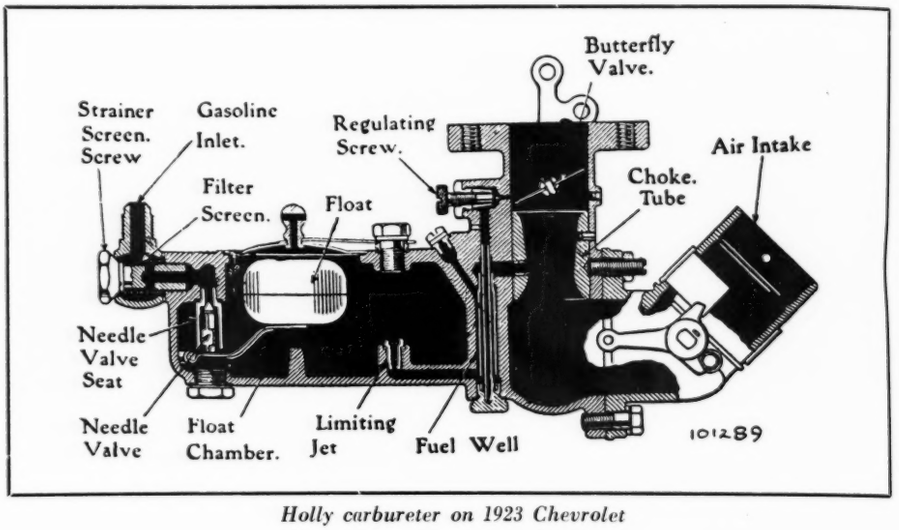
Chokes When Accelerating

Q.—A customer of mine came in the other day to have me overhaul his car. It is a Chevrolet Superior model that was new in 1923 and has the new model Holley carbureter. He says it has given trouble ever since he had it due to poor acceleration and using too much gasoline. When the throttle is quickly opened the engine seems to knock in two cylinders and kicks back, then takes hold and picks up to the speed indicated by the throttle opening. He says he gets 12 miles to a gallon of gasoline. Other Holley carbureters of the same type have been tried without improving the operation.

I ground the valves, adjusted bearings, lined brakes, cleaned out carbureter and checked gasoline level which stands at ½-inch below top of float chamber. Also examined vacuum tank, cleaned out gas line, checked exhaust valves, which close when piston is 1/16-inch down from top dead center. Checked valve clearance at .005 inches and timed ignition. I found the two front inlet valves had more clearance around the stems than the other two, but did not put in new valves. Also cut off inlet manifold and raised carbureter 6 inches and checked for air leak. Compression is good but after trying car on the road there was no improvement. Then gave valves a clearance of .020 inches and acceleration was better but not right. Henry Hier, Rushville, Ind.

We are showing an illustration of the Holley carbureter for reference. Would recommend that you remove the cover of the float chamber and see that the gasoline level is lower than at present. The recommended level is 9/16 from the top of float chamber and you can increase this distance by bending the float down. A local Chevrolet service man recommends in some cases having the level as much as 3/4 inches below the top of float chamber.

The reason for this is that with a high level for the gasoline the carbureter loads up and then when an attempt is made to accelerate it chokes and will not pick up properly. We also believe that improved operation could be obtained by using a manifold which combines a hot spot. If the clearance around the valve stems is excessive improved operation might be obtained by reaming out and putting in oversize valves or by using a valve packing of some sort.



Holly carbureter on 1923 Chevrolet

THE CAMSHAFT BEARING SLIPPED

We have just read your question on page 23 of the May 7, 1925, issue of MOTOR AGE about a so-called valve knock in a Jewett engine. Wish to say we have experienced the same difficulty in a Jewett belonging to one of the officials of our company. We found this knock to be due to the fact that the rear camshaft bearing had slipped forward sufficiently to allow the last push rod to come in contact with it causing a knock very similar to that of a tappet noise. By loosening the set screw that holds this bearing and driving it back into place our knock was eliminated. The Indian Territory Illuminating Oil Company, M. H. Snoddy, Garage Department, Bartlesville, Okla.

MOTOR AGE is very glad to have this letter which gives a very plausible reason for a condition of this sort.

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

All questions are answered direct by letter, so the name and address should be given in full. This saves waiting for the answer to be published, which sometimes occurs several weeks late, depending upon the space available.

Readers' names will not be published with articles, if a request to this effect is received with the letter.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

Removing Crankshaft Play

Q—I have an easy way of taking out the end play in a Ford crankshaft. I first remove the small timing gears on the crankshaft and put a rear axle felt retaining steel washer on the shaft. I then put the gear back on and put a groove or a center punch mark around the front of the gear to keep it from slipping. I have found this method gives service for almost a year.

I have in mind one car having a cubic inch piston displacement of 250 inches which develops more power than a second car which has a piston displacement of 290 cubic inches.

Suppose these two cars have equal weight. Which one will have more pulling power when the car is running up hill at 15 miles per hour. I always thought the actual horse power was determined by the amount of fuel it uses or the total cubic inch piston displacement.—Oklahom Subscriber.

The piston displacement is not a measure of the power that the engine can develop for the piston displacement is figured on the basis of two revolutions of the engine, that is, allowing each cylinder to fire once. From this it can be seen that if one engine turns twice as fast as another it will have a chance to burn twice as much fuel assuming that the two engines are the same size. There are however, so many factors that enter into engine design and affect the power that there is no formula or measurement which will enable us to say which one will climb a hill better or which one will pull better. This can be determined by trying out the car and in the case of the engine it can be determined if a horse power and torque test is made.

Assuming that one engine is designed as well as another, the power will usually be proportional to the amount of fuel burned.

Planning Your New Building

By TOM WILDER

The READERS CLEARING HOUSE

Floor Space Well Proportioned Is the Prime Feature of a Storage Garage

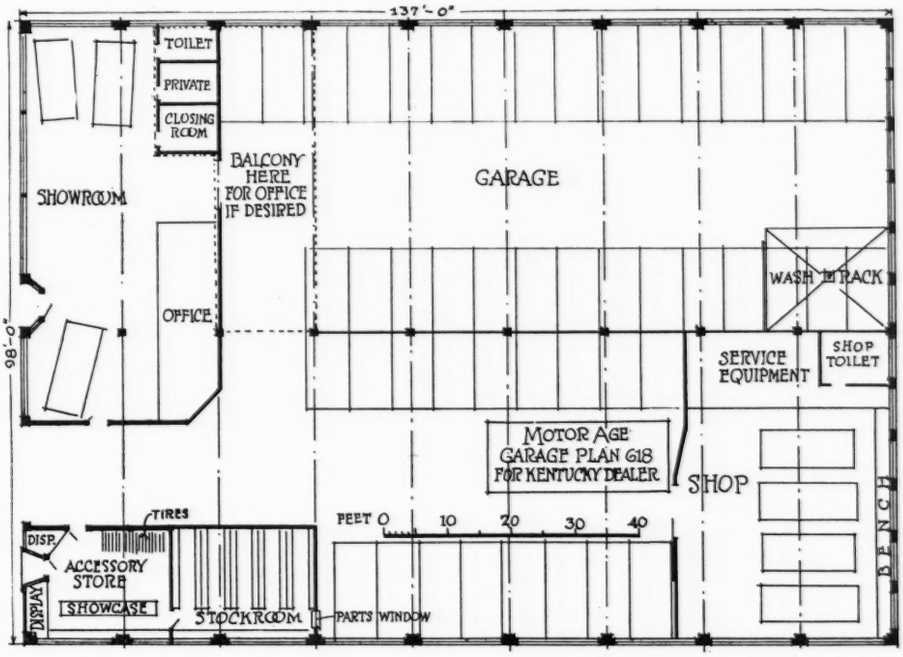
Q.—We are encosing a rough sketch of a plot of ground fronting 98 feet on the street and running back 137 feet to an alley, there being an alley on each side of this plot. The plot fronting 54 feet on the street has a two-story building running back 85 feet, and it was our first intention to build a garage upon this ground and try to save the wall that is already there as designated by the red line, but we cannot figure out how we can be able to store more than about 18 or 19 cars after making provisions for show room for new cars, stock room, office space, etc., and a shop and wash rack. Want shop to accommodate about four men.

If you can give us plan whereby we can get more storage space we would thank you to do so. You will note the sketch shows another piece of ground fronting 44 ft. on the street and running back 137 ft. to the alley and we believe that this ground may be bought at a reasonable figure.

After studying the proposition of building a garage on your 54-foot lot, we have come to the same conclusion that you have, namely, that not more than 18 or 19 cars could be stored with suitable provision for other departments. With this is mind we have gone ahead on the 98-foot layout since there is no alternative except to build two stories. Building a two-story building, however, on a 54-foot lot would not be satisfactory, as it would necessitate elevator communication and we are of the opinion that the cost of the elevator, the cost of maintenance and the inconvenience would not make up for the added cost of the land and the convenience of the building all on one floor. As to the difference in cost of the two buildings, there would be about the same difference as there is in the area, the larger one being a little less in proportion since there would be more unfinished storage space in proportion to the total area in this one than the smaller.

If built here the larger building would cost in the neighborhood of $2.50 to $3 per square foot and this would figure around $35,000. Of course, we do not know the condition of labor in your market, but the price with you should not be any greater than this. Your best course is to get some figures from local contractors and then you will know definitely. One contractor will often figure 50 per cent higher on the same job than another, so you can see our figures do not mean much.

In this plan we have devoted as much space as possible to storage and since you are featuring storage, it is probably advisable to make your entrance in the front of the building. If the alleys are ample in size and not congested, they might be used, one as an entrance and the other as an exit, making the doorways on opposite sides of the building, but we would hardly advise this in a storage garage as the accessibility of the entrance makes considerable difference to your customers.



Separate the small cars and store them on one side of the aisle to gain aisle width

We have shown the general office in the corner of the showroom, but if more office space is desired, or larger showroom space, a balcony might be used as suggested in the drawing. In this case, the front of the building including the showroom and office space will have to be built up higher in order to get the added headroom necessary for the balcony.

The windows along the side of the building should have their sills about 8 feet from the floor and extend from there to the point where the trusses meet the sidewalk or about 4 feet. With cars stored along the side walls, the lower part would be of no value in admitting light and the cost of the glass might just as well be saved. Skylights must be used to get light into the center part of the building. One will be absolutely necessary over the balcony, if it is used.

LEGAL QUESTIONS ANSWERED

By WELLINGTON GUSTIN

of the Chicago Bar

CAN COLLECT FOR STORAGE

Q—I have in my possession a Buick Six touring car that was towed in for some necessary repairs on August 20, 1924. The repairs were made and the owner notified that the car was finished, also that space was valuable and was renting for $5 per month. I have since sent him no less than four statements and to date have not heard from him. How long must I hold the car before I can sell same to cover, repair parts, labor and storage? The parts and labor came to $27.57 and the job was completed on August 3, 1924. The owner is a large real estate owner in a neighboring farm community, but the car is about a 1918 and has seen some hard knocks. Can he be made to pay the bill or will I have to sell the car to get my pay? How would you proceed?—Jesse Egly, Egly's Garage, Forrest, Ill.

Where the garagekeeper repairs a car and notifies the owner that same is ready for delivery and that he expects storage charges for keeping he may charge a reasonable rental for storage together with his charges. Now you have a lien on the car in question, which you may foreclose according to the statute, or hold, at your pleasure. You may start foreclosure proceedings at any time.

If the customer is worth a judgment it would appear a simple matter to bring suit for the amount of your claim, and then when judgment is obtained you may levy upon and sell enough property to fully satisfy your judgment and court costs.

Clearing Up Electrical

The READERS CLEARING HOUSE

EDITED BY A. H. PACKER

Ordinary Generator Not Suitable for C. P. Charging

Q.—Do you know if Thomas Edison is going to put a radio on the market? Also give address of some Edison office or factory.

Thomas A. Edison, Inc., is located at West Orange, N. J. with offices in both Chicago and New York, but we have no information as to whether this concern is going to put a radio on the market or not.

Q.—Why is it that a constant potential charging outfit can charge a battery in eight hours without damage?

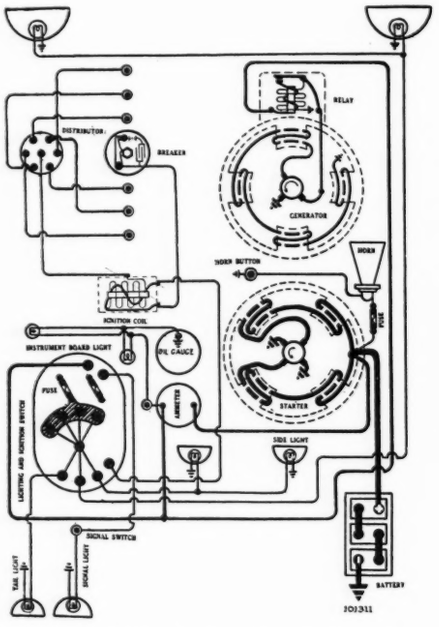
Damage in battery charging occurs only when a battery is overheated or when it is charged so fast that the electrolyte boils violently and disturbs the active material and loosens it from the plates. Therefore the charging rate can be very high if the battery does not gas or overheat. When a battery has been discharged and has not been allowed to stay in a discharged condition until hard sulphate has formed on the plates it can be charged at a rate of 50, 100, 150 amperes or even higher for a short time.

A battery while in a discharged condition and while receiving charging current will show a low voltage, approximately 6 while the same battery when fully charged and with charging current still flowing into it will show a voltage of about 7.5. For this reason if a generator can maintain a constant voltage of about 7.5 or slightly higher there will be a difference of 1.5 volts when operating a discharged battery and practically no difference in voltage when charging a fully charged battery. Therefore as the battery becomes charged and its voltage rises the charging current will be automatically reduced.

This does not mean of course that a constant potential system can be operated without any attention, for in nearly every case the battery will be to some slight extent sulphated, and may have to be disconnected for a time to prevent overheating. This does explain however, why the 8 hour charging is practicable for the heavy amperage which the battery can take at first materially cuts down the time required.

Q.—If I use a 32 volt dynamo and regulate the amperage according to the number of batteries connected and the amount the battery has in it from time to time and connect them in parallel the same as on a constant potential system what would be the difference between this and the constant potential systems which are being sold now?

The difference is in the design of the armature, brushes and other circuits of the generator which must carry the current. For example we might have a machine capable of giving out 25 amperes at 32 volts and another machine capable of giving out 100 amperes at 8 volts. The latter type would be known as a constant potential machine for its voltage is about right for charging one battery. You could reduce the voltage of a 32-volt generator so as to charge the batteries in parallel but you would be limited to 25 amperes and accordingly would accomplish nothing.



Present Rickenbacker electrical circuits

If you tried to take more than 25 amperes from this machine you would find that the brushes would overheat and that the armature would overheat. This is due to the use of small brushes and small wires in the armature as compared with a constant potential type of machine.

Q.—Has any company got this constant potential type of machine patented?—H. L. Ludewig, Park Garage, Pittsville, Wis.

The general principle of building a generator to supply heavy current at low voltage is not new and we do not believe that there is any basic patent covering this. There may however be patents covering various systems of voltage control.

LAZY GENERATOR—TOO MUCH OIL

Q.—Why is it that a generator on a Ford car will not cut in and start to charge until you speed up the engine to very high speed after it has been standing for some time?—D. C. Slick, The East Granite City Garage, Granite City, Ill.

This condition usually occurs when too much oil has been put into the rear bearing of the generator. The oil gets on to the commutator and soaks into the brushes and forms an insulating film. It then requires either high speed or running for a time until the brushes heat up and the oil thins out so that current gets through readily. The remedy is to install a new set of brushes and then be very careful not to over oil the generator.

Two Ways of Recharging Magneto Magnets

Q.—I am looking for information in regard to a Ford magnet recharger which I purchased second hand. This charger has four quart jars which are filled with liquid and there is one positive and one negative plate in each jar. There are wires running from one-half of the negative plates and one of the positive plates to a 110 volt line and two wires lead from the other half of the plates to the car. The one coming direct from the plate goes to the magneto post which is located on top of the flywheel housing. Can you advise the nature of the liquid that is used in these jars.—Marker's garage, 730 N. Jefferson street, Muncie, Ind.

This is known as an electrolytic rectifier and uses a saturated solution of ammonium phosphate.

Q.—We sent the rectifier to an electrical service station and they returned it and said that could not repair it. Can you advise where this charger can be repaired as we cannot tell the make of it.

Devices of this sort have been used with alternating current for the purpose of changing it to direct and also to cut down the voltage. However if you have four or five good six-volt batteries in your shop at any one time you can recharge the magnets in the Ford magneto without bothering with either an alternating current or with a rectifier. From time to time we publish instructions as to how this should be done and we also have these instructions in typewritten form. We are accordingly mailing you a copy and believe that if you study them carefully you will find that the process of recharging is very simple. It can be done in 15 or 20 minutes if you have a compass and four or five batteries.

POOR CARBURETION SOOTS THE PLUGS

Q.—We have been having trouble with a 1916 model Franklin six and a 1924 model Ford. These cars get dry soot on the plugs. The Franklin misses on No. 1 and 5 in about 20 miles and the Ford behaves about the same way. We have checked up the electrical system and replaced practically all parts on the Ford and have put in new rings, but this did not overcome the condition.—Leonard Johnson, Walker Garage, Revere, Mo.

We do not believe this is a case of oil getting into the combustion chamber. It appears to be trouble with the carbuetion. Since 1916 the quality of the fuel has changed so that it would be advisable to install a new type manifold and carburetor which can be obtained through any authorized Franklin dealer. On the Ford car, we would recommend the installation of a hot spot manifold.

WIRING OF 1925 RICKENBACKER SIX

Q.—Supply wiring diagram of the 1924 and 1925 Rickenbacker six.—D. C. Slick, The East Granite City Garage, Granite City, Ill.

The wiring diagram is published at the top of this page in accordance with your request.

Trouble With Bill Fixit

EDITED BY A. H. PACKER

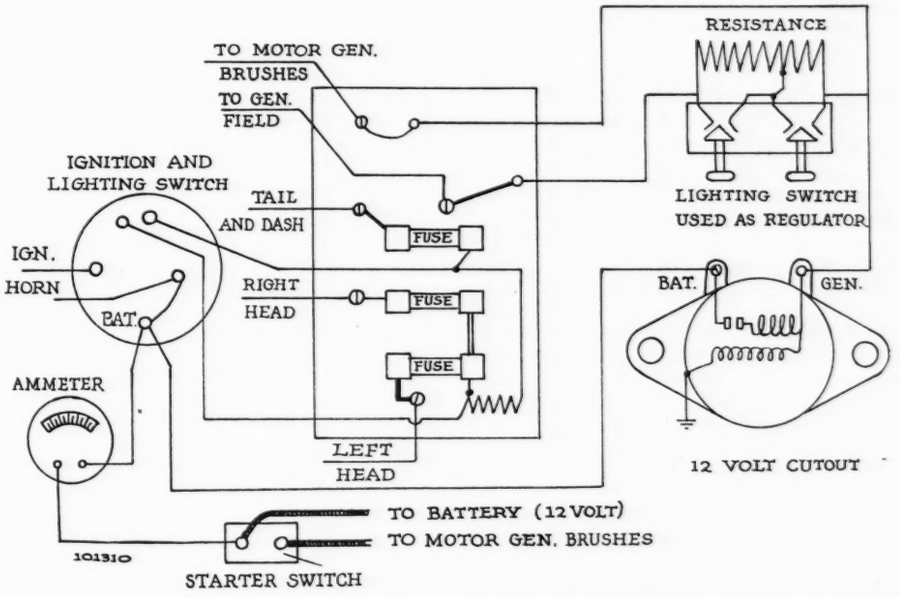
The READERS' CLEARING HOUSE

Simple Wiring for 1918 Maxwell

Q.—Supply wiring diagram for installing simple regulating scheme on a 1918 or 1919 Maxwell as printed on page 26 of the June 18th, 1925 issue of MOTOR AGE.—D. C. Slick, The East Granite City Garage, Granite City, Ill.

At the time of writing the article to which you referred we had merely made a pencil sketch for the MOTOR AGE subscriber, Sidney Topness, of Taylors Falls, Minn. There is so much interest in this old electrical system however, that we have decided to publish the diagram in question. We are also sending you a copy by letter. In the diagram we have shown the old Maxwell fuse block and ignition switch. The ammeter, cutout switch and two gang lighting switch used for regulation have been added, and the diagram shows the method of wiring up these units.

The resistance on the back of the lighting switch which is used for a regulator might be the regulating resistance taken from the old system. If this is not in condition or is not available then iron wire could be used with twice as much wire in one coil as in the other. The operation of either button or of both buttons at the same time will give four different resistance values in the field circuit, so that the current may be controlled in proportion to the car speed. This system of regulation while simple and not likely to get out of order, of course requires some attention from the driver. If, with both buttons pulled out the charging current is still too high, then it means that more resistance wire or a greater length of wire should be used.



A standard cutout and switch replace the Maxwell regulator

Alarm Clock to Turn Off Show Room Lights

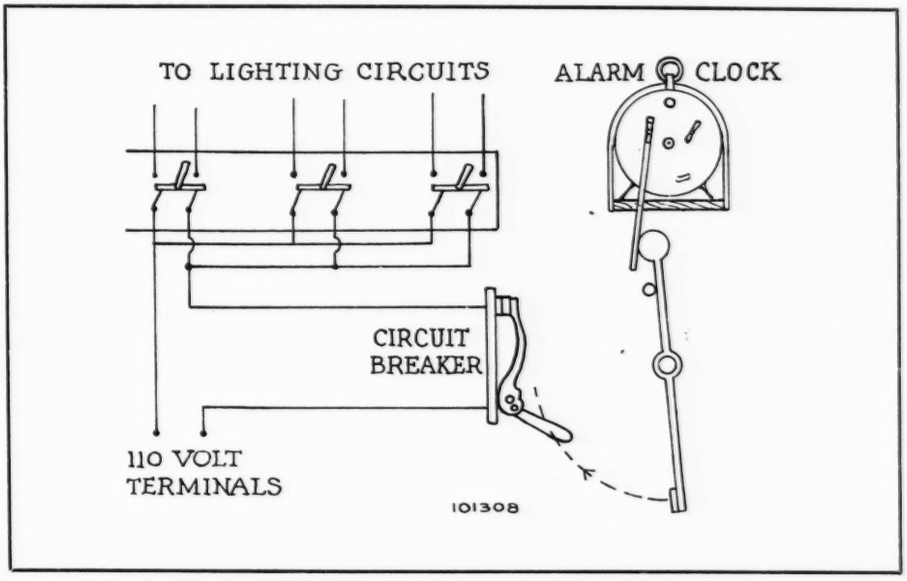
Q.—I would like to have some information on how to cut the salesroom lights off with an alarm clock. If there is some way this could be done. I would sure appreciate it. If this will be any benefit to you, there are about 12 switches all operating different lights but I figure on cutting the current off from the whole switch board at once. The current is 110 volts, 50 cycle A.C.—Long Beach Subscriber.

If the circuits in your salesroom are fused, we believe it would be advisable to either replace the fuse box with a circuit breaker or else install a circuit breaker in conjunction with the fuse box. The service department of the company which supplies your power can probably recommend a suitable circuit breaker.

Most of these devices are designed to open when a short circuit occurs and are operated by the heavy current flowing. The circuit breaker is then reset by means of a handle which is usually pulled down. On the other hand the circuit breaker may be operated by hand if the handle is pushed up. We have not shown 12 switches, but have indicated three and you would merely extend the circuit for your purpose.

We have also shown an alarm clock with the winding handle equipped with an extension. We have also shown a lever pivoted and with a weight at its upper end, it being very nearly balanced and a pin being used to keep the weight from swinging down. In operating the device the alarm clock would be wound up until the extension of the handle is in approximately the position shown. The operation of the clock permits the handle to unwind, so you would have to figure which way the handle is going to turn before you would lay out the whole apparatus.

If in the illustration shown the handle will unwind to the left or counter clockwise, it will push the weight over center, moving it to the right, and the lower end of the weight lever will swing up and strike the handle of the circuit breaker causing it to trip and shutting off the lights. It will be necessary to mount the alarm clock on a suitable shelf and hold it down by means of a metal strap so that the clock would not be tipped over when the alarm operates.



This shuts off the juice when the folks have gone home

Motor Age's Flat Rate Forum

EDITED BY B. M. IKERT

Some Suggestions When Installing a Fixed Price System

NOT long ago the owner of an automotive repair shop told us that flat rate was all right for the shop working on one make of car, but that you could not apply fixed prices for repair work in the shop catering to work on practically every make of car.

A statement such as the owner of this shop made might have been all right a few years ago before the flat rate system was as fully worked out as it now is.

Flat rate has proved many times that it will work in any kind of shop, even the small town dealer who has to make his living repairing automotive vehicles and who naturally cannot concentrate his work on any particular make of car is successfully using flat rate in many localities today.

If the small town dealer's competitor for example, does a job of regrinding valves, cleaning carbon and tuning engine for a fixed price of $10.50, such a dealer then must come mighty close to that figure. If the competitor requires four hours for the job, then he too must do the job somewhere around the scheduled four hours.

It obviously is wrong for the dealer to have a mechanic around who is a slow worker and likes to tinker around a car, thus handing in a time card with eight hours marked up for the job. The customer is the one who gets the wrong end of the deal in this case.

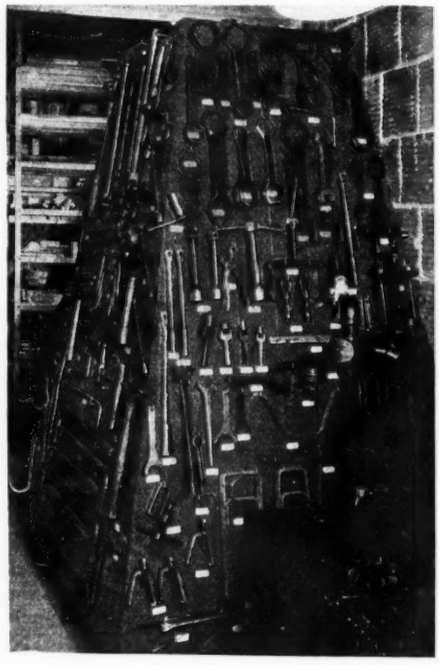
We have long maintained that the so much per hour rate of charging for automotive repair work is wrong, unless it is for operations on which it is difficult to place a flat price such as where parts are "frozen". Even then it is perfectly possible to have a fixed price under such conditions, because many service stations and shops in doing work on steering knuckles for example, have a definite price on such work when the parts are in normal shape and also a definite price when such parts are rusted or frozen and require considerable more time for the work.

To those contemplating the establishment of a flat rate system a few words of advice are given.

1. The first thing to do is to clean house. No one can apply the flat rate profitably where dirt and disorder prevail.
2. Keep records. Usually a lot of figures have to be handled before the flat rate system can be put into effect. Even though flat rate prices and time schedules are available such as in the MOTOR AGE Flat Rate Manual, time sheets and other records must be kept to check this system for revision to suit labor conditions and other local conditions.

Give Price of Parts

3. Price of parts. So far as possible the customer should be given the cost of the operation plus parts needed, if possible. Some companies have had their flat rate schedules worked out to include the price for labor and parts. It may be misleading to quote a customer a price on installing a new connecting rod when he is given the price of the labor only and later on gets quite a jar when his total bill includes a new rod.
4. The exact cost of a job is not always possible. Sometimes the work necessitates the complete tear down of an engine or other unit before an inspection can be made and the job properly diagnosed. However, there can be a definite price for the tear down and reassembly for which the customer pays in case he does not want whatever work is necessary. Most of the flat rate systems of today specify tear down and reassembly operation to which can easily be added any additional work necessary. This easily answers the frequently asked question about the impossibility of quoting a customer a flat price on a hidden operation such as ring gear and pinion work.
5. Prices will vary. Prices for certain operations on the same make of car will vary in different localities owing to the different costs of labor and working conditions. But even so many of the dealer service stations have the same price schedule on their operations from Bar Harbor, Maine to Coronado Beach, Calif.
6. Ability of average mechanic must be considered. Just what constitutes an average mechanic, we not know, but at any rate in establishing the time factor for any given operation the time must not be based on the ability of the fastest man in the shop, but rather on that of an average workman.



THINGS THAT HELP FLAT RATE
Tools, tools, tools. Always it becomes a question of having the right tool for the job. One of the things which makes flat rate efficient and profitable is having all the necessary tools and equipment to do specific things

MOTOR AGE'S FLAT RATE FORUM

No. 24

OLDSMOBILE MODEL 30 FLAT RATES FOR BEARINGS, CRANKCASE, CYLINDER HEAD, CRANKSHAFT, CAMSHAFT AND GEARS

Manufacturer's Official Designation		Time
M-2, 1	Install complete set of main bearings	4 hrs. 15 min.
M-2, 2	Install new crankshaft thrust washer	2 hrs. 00 min.
M-2, 3	Install new front main bearing	3 hrs. 15 min.
M-2, 4	Install new crankshaft rear bearing cap cork	1 hr. 45 min.
M-2, 5	Install either new rear or center main bearing	1 hr. 45 min.
M-2, 6	Install both new center and rear main bearing	2 hrs. 15 min.
M-4, 1	Install new flywheel	4 hrs. 00 min.
M-5, 1	Install new set of timing gears	3 hrs. 45 min.

EDITORIAL

Trade in the Quake Zone

RECENT earthquake damage in California is not expected by the trade of that section to seriously effect automotive sales. That sounds cheerful and reasonable. While local disasters in this country have always demoralized business temporarily and rendered the people momentarily stunned they have been followed usually by periods of constructive, unprecedented progress.

The disaster's challenge to American enterprise has always been squarely met, with the result that such visitations have only planted the seed of yet greater accomplishments—and yet greater cities. Chicago's fire in 1871 was only the signal for an upbuilding spirit such as Chicago had never known before. The building of a greater Galveston came directly on the heels of the Galveston flood of 25 years ago. San Francisco's earthquake and fire of 1906 touched the spring that put constructive effort in high speed.

What disaster does do is put the agencies of cooperation and determination on their mettle. It brings the people of a community into closer fellowship—and where such disasters have been in this county they have been followed by a better social and business status all around. No one need worry about the future of the automobile trade in Santa Barbara. Reconstruction will release a tremendous flood of money, giving profitable employment to many buyers, and reconstruction will put that city in a vastly improved position as a city and with respect to business opportunity.

Bus vs Private Ownership

JUDGING by occasional expressions in recent gatherings of bus operators there is a feeling in certain quarters of this industry that private automobile ownership competes most formidably with the bus. One bus operator declared not long ago that private automobile ownership is much more to be feared by the bus industry than the steam and electric lines.

There is not much danger of conflict between the bus industry and the automobile trade because we feel convinced that the great majority of bus operators do not share in the opinion above set forth and we have seen nothing within the automobile trade to indicate anything but a fraternal feeling on the part of automobile dealers toward the bus field.

The bus man whose ambitions for his industry contemplate a great abandonment of private automobiles because of carrying service that a bus might render is simply basing his analysis upon an illusion. Business for the bus is destined to grow and we can look for the annual number of persons carried by buses to reach constantly greater proportions. More and more passenger car owners will ride in buses as bus facilities develop and expand—but that does not mean passenger cars will be junked or that there will be less passenger car driving. The bus is a public convenience and as such it will be patronized by the general public.

On the other hand the passenger car is a private convenience which no public mode of transportation can replace.

Both fields of business are as distinctive as barbershops and safety razors. Their interests are more mutual than otherwise and for common welfare their futures will demand harmonious cooperation.

American Cars Abroad

ANYONE who frequently inspects foreign magazines and newspapers is bound to observe that lately there has been a steady growth of advertising space taken by American automobile manufacturers.

These insertions tell the story of more intensified campaigning by American producers to obtain bigger business abroad. This, no doubt, will be a record year in the exportation of automobiles from our country.

Popularity of the American product in other countries rises pleasingly upward. Not only do people of other lands find certain superiorities in the American products but, as stated by a well known student of merchandising who recently studied conditions related to the industry in various parts of the world, the foreign owner is learning that replacements are more easily and certainly procured in the United States than in any other country where automobiles are manufactured.

We hope, for the good of the industry, that our manufacturers will pursue this advantage abroad for all it is worth—and there is no doubt it could be made worth much in the enlargement of American automobile output.

Buyers in foreign countries are just like buyers in this country. When purchasing a car they want assurances that getting correctional service and replacements will not be a difficult matter. The stronger these assurances can be made the better. The quicker the service can be delivered the better.

Going and Coming

WIDE-AWAKE automobile merchants keep a sharp lookout for business with the vacation tourist. Some dealers go about this phase of the work in a systematic and more or less comprehensive manner.

If there is no chance to sell the vacationist a car there might be a chance to sell accessories or maintenance.

Now—how about that same vacationist as he returns from his trip?

A long, hard motor trip might mean needed repairs, adjustments or even a new car. The motorist who started off on a long trip with an old car might come home about ripe for another buy. These are good contacts which are capable of developing new leads. And isn't the modern idea to develop as many good contacts as possible? It is contact that often changes the owner from a "suspect" into a "prospect."

Sales Volume Greater Than a Year Ago

Normal Rate of Seasonal Decline Seen in Industry

New Models Hold Center of Interest With Prices Being Lowered in Several Instances

NEW YORK, July 29.—Sales in nearly all automobile lines are showing the normal ratio of decline from the brisk business during the height of the season, but cars, trucks, tires and accessories are all being disposed of at a higher rate than at this time a year ago, a condition eminently satisfactory to the industry.

Just now the center of interest is held by new models, and the price changes that accompany them. By August many changes will have been announced and the cars will be on sale, when an opportunity will be given for a better line on just how good late summer and fall business will be. Many prospective buyers customarily wait to see the new models before buying.

In several outstanding instances prices are being lowered, but this is a condition that the industry has come to expect with the introduction of new models. It is unlikely that the reduction will seriously affect earnings of the companies, as the factories are being run on a higher plane of economy than ever before, and as a good volume of business can justly be expected to follow the attractive prices now being established. Of course a price war would result unfavorably, but only the most pessimistic see any signs of such a condition.

The fact that most of the price cuts were withheld until the spring selling season had passed is a source of considerable satisfaction, as otherwise the business of dealers would have been badly disrupted. As the situation stands now, dealers in virtually all the leading lines are in exceptionally good condition, with stocks low and old models pretty well cleared from the floors.

The new cars for the most part represent only minor changes in chassis design, which means that no expensive alterations in plant equipment were required for their production. The greatest changes have been in the bodies, and a continuation of the tendency toward brighter colors, less height, and smoother streamline effects is noted. Even the most conservative factories are giving way to what has been demonstrated to be the prevailing taste of the motoring public.

BUCKWALTER PROMOTED

CANTON, O., July 25.—T. V. Buckwalter, who has been chief engineer for the Timken Roller Bearing Company was made vice-president in charge of engineering at the July meeting of the directors of the company.

FAGEOL TRUCK PRICES CHANGE

OAKLAND, Cal., July 25.—Price changes in their line of trucks have been announced by the Fageol Motors Company simultaneously with the bringing out of a new one and a half ton truck chassis. The price of the two-ton model has been increased from $3,300 to $3,750, while the 4 and 6 ton models have been cut $150 and $350, respectively, and now list at $4,950 for the four-ton and $5,450 for the six-ton model. The new one and a half-ton truck lists at $3,150.

Michigan Expects Registration of 955,000 Cars This Year

LANSING, Mich., July 25.—Approximately 955,000 motor vehicles will be operated this year under Michigan licenses according to estimates prepared by Charles J. DeLand, secretary of state.

In spite of the 100,000 increase over last year, the license revenue will not be more than $13,000,000, or $1,000,000 below legislative estimates. To date only $11,500,000 has been received, and comparisons with other years indicate that the total will not run much higher than $13,000,000.

The state so far has ordered 960,000 sets of license plates. The original order was for 950,000, but a sudden demand for plates in Detroit was responsible for the extra 10,000 which were delivered direct to the branch office there.

The loss in revenue from the weight tax, however, will more than be made up by the gasoline tax which so far has exceeded original expectations. It is probable its total will run close to $9,000,000 as compared to the original estimate of $6,500,000.

VELIE PLANS NO CHANGE

MOLINE, Ill., July 25.—The best information here is to the effect that there will be no change in Velie models announced on August 1. It is indicated, however, that on August 23 there will be some changes in design, not classified as model changes, announced. It is known that the same chassis and four wheel brake patterns will be followed with the principal change being in the body line of a four-door sedan which will be put out to take the place of the present coach model. Production continues along the usual rate with better than 50 cars a day being turned out.

EXTRA GOODYEAR DIVIDEND

TORONTO, July 25.—In addition to the regular quarterly dividends on the prior preference and preferred stock of the Goodyear Tire and Rubber Company of Canada, Ltd., for the second quarter of the year, an additional 1¾ per cent was declared to apply on the deferred dividends on the preferred, bringing arrears down to 5½ per cent.

Tire Dealers Advised to Buy Only for 40-day Turnover

National Association Counsels Against Taking Chance of Losing When Market Turns

NEW YORK, July 28.—"Buy only for a forty-day stock turn at the outside." This is the advice which the National Tire Dealers' Association is giving its members.

"Our reasons for making this statement at this most important time," says George J. Burger, president, "are due to the fact that this industry has had four advances in a ninety-day period.

"There must be something serious in the crude rubber situation to cause these sensational advances. Rubber manufacturers have been urging their dealers to buy only for immediate requirements. Will dealers go beyond this advice and gamble on possibilities? It is far better to take a profit on a forty-day stock than to find yourself overloaded when the market goes the other way."

Discussing retail prices, Mr. Burger has written to dealers:

"You fully realize that if you had the good fortune to purchase tires before the price advance, there is no reason why you should be a philanthropist and give away the possible added profit to those who may be in need of tires.

"For fully five years the market has been going the other way. Why not try to make up for some of the lean years? When you sell tires you purchased before the advance you have to go into the market and again purchase at the newer price, so you really do not gain any real profit because you were fortunate in buying and re-selling at the new."

Louisiana Registrations Are Expected to Reach 200,000

NEW ORLEANS, July 25.—Louisiana's motor vehicle registration for the present year will almost reach 200,000, about 21,000 more than in 1924, when the registration reached a total of 178,500, including trucks and trailers, according to C. F. Bailey, motor registrar in the office of the secretary of state in Baton Rouge.

According to Mr. Bailey, up to July 15 the registration was about 185,000 and at the present rate, in the remaining five and one-half months, 15,000 more vehicles would be registered. The total collected for motor vehicle registration to July 15 and approximately $3,400,000 while for the entire year of 1924 the total was only $2,738,269.92. By the end of the year the registration fees will be close to $4,000,000.

On the basis of the foregoing figures, the 1926 registration was estimated at 210,000, but in all probability will be even greater than this estimate, which is conservative.

Dealers' Stocks of Old Style Models Are Unusually Low

Situation Believed Best in Years as Sales Have Kept up to or Ahead of Output All Season

DETROIT, July 25.—At a time when dealers' stock of old style models ordinarily are plentiful, especially when certain manufacturers are bringing out new models, this year finds the situation exactly the opposite.

In fact, certain of the larger car manufacturers, find that the stock of the 1925 models which will be the old models in the near future are down to bedrock and that this situation is the best in years. Few if any are to be found in the dealers' showrooms. This condition does not apply to any certain locality but is apparently nationwide.

Trying to find the reason for this is extremely hard. Most of the manufacturers attribute it to the continued buying which except for a slight seasonal decline has not dropped to any great extent. One reason may be that the late spring in certain sections of the country has caused the buying demand to continue, another is that the prosperity throughout the United States is greater than for the past few years and the third is that the manufacturers have used good common sense in gauging their production.

Despite the knowledge of certain of the motoring public that new models will shortly appear, one of the leading automotive executives said that this fact was not deterring them from making purchases. They, the buying public, realize he said, that the new models will not differ greatly from the old ones, and that the value they will get for their money will not be greatly different. This, coupled with their desire to own a car, has led to the stock of 1925 models in the field to be exceedingly low at this time.

Purchase of Fleetwood Body Co. by Fisher Is Announced

DETROIT, July 25.—Purchase of the Fleetwood Metal Body Company, Fleetwood, Pa., by the Fisher Body Corporation, is announced by W. A. Fisher, president of the Fisher Body Corporation. The shops will be maintained at Fleetwood under the direction of Ernst Schebera. The purchase brings about the retirement of Harry C. Urich who founded the company.

Except for a few minor changes, the policies of the Fleetwood company will be followed. It is believed that jobs calling for individuality to suit the taste as outlined by the purchaser will be completed here.

In purchasing the company, Mr. Fisher said that his company had but one object in view and that was to preserve of the finest traditions of hand-craftsmanship to be found in the United States.

Boston Department Store Sells Cars

BOSTON, July 25.—The Gilchrist Company, one of the largest department stores in Boston, has announced that it has signed a contract to sell Hudson and Essex cars in its building as a sub-dealer under the Henley-Kimball Company. The Gilchrist Company occupies a large building on Washington Street at Winter in the heart of the department store district. It is remodeling one part of the store with a private entrance on Winter place where the cars will be displayed. This is the first time that any department store has ever gone into the sale of automobiles in New England and the outcome will be watched with interest. To meet the fire laws various regulations must be obeyed and the section of the store where the cars are displayed will be made fireproof.

Boston Plans Garage For Bus and Truck Use Only

BOSTON, July 25.—Ground has been broken in Boston for what will be the first garage erected here for the sole use of buses and trucks. It will be located in the business district just on the edge of the big retail department store section on one hand and the waterfront and railroad terminals on the other. It is planned to accommodate operators of buses running between Boston and out of town places and also trucks used in long hauls. At present the big increase in bus operation has been such that it is difficult to house them near their terminals. The new garage will accommodate 400 buses and trucks.

It will be a two-story brick and concrete structure fronting 140 feet along Albany and Lehigh streets and will extend 290 feet back toward the waterfront. It will cover more than 26,000 square feet giving double that area with its two floors, and allowing for additions when business warrants it. A ramp 110 feet in length will lead from the first to the second story providing an easy grade.

Among the features will be the partitioning off of sections to be assigned to fleet owners, and the construction of special repair rooms. There will be lockers and shower baths for drivers and helpers. The owners are T. J. Moynahan, Jr., and Albert Erlandson. Mr. Moynahan operates a fleet of trucks used in the distribution of newspapers, and who found it most difficult to garage his vehicles without scattering them widely. Mr. Erlandson has had many years experience in garage work.

RUBBER WORKERS' WAGES CUT

NEW YORK, July 25.—Reports reached here today announcing 5 to 10 per cent wage reductions at the Goodyear Tire & Rubber Co. Ajax Rubber Co. also was said to have cut wages.

Wisconsin Commissioner Hits Chrysler Insurance

Opposition to Plan Is Based on Four Counts—Threatens Action if Company Persists

MILWAUKEE, July 25.—Strong opposition to the plan of the Chrysler Sales Corporation of Detroit to offer an insurance contract with each car sold has developed in the insurance department of Wisconsin where Commissioner W. Stanley Smith has threatened "to take action" if "delivery charges on cars sold after July 18 include an insurance premium and you continue to give the above kind of coverage in accordance with the plan."

Commissioner Smith's opposition is based on four separate counts. He alleges first that the company is not licensed to do business in Wisconsin, meaning the Palmetto Fire Insurance Co. of Sumter, S. C., which is underwriting the risk. Although the company has application for a permit on file, the commissioner claims that he is not disposed to grant Wisconsin privileges because "the rates on Chrysler cars are apparently discriminatory and could not be used in the state."

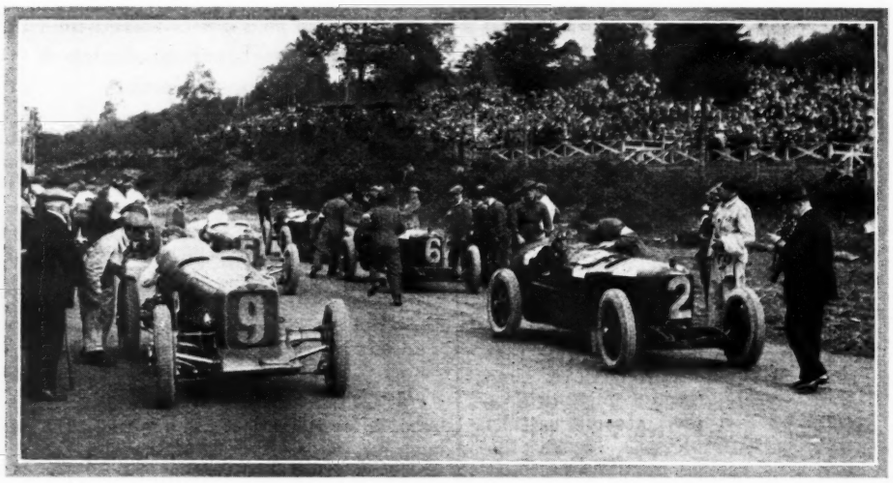
Secondly he objects to the plan, calling it illegal because every Wisconsin Chrysler dealer would in some manner aid or assist in placing this insurance, and they are not licensed as insurance agents under the law. Thirdly he finds fault with the plan because fire and theft policies under Wisconsin insurance law must be countersigned by a resident agent, and could not therefore be sent from Detroit and be construed as a Michigan contract. Fourthly he objects because provisions of the policy do not provide for a return of unearned premium in case of cancellation and exclude other provisions required in policy forms by the Wisconsin insurance laws.

"We are not acting as insurance agents nor insurance collectors, declared George E. Brown, general manager of the E. W. Clark Motor Co., which distributes Chryslers in Wisconsin. "Every Chrysler car comes equipped with an insurance policy. It is as much an accessory as a pair of headlights. The car is sold that way. The buyer if he does not like it, can tear it up. If he doesn't like the headlights he can get them changed too. Under the Chrysler plan every car that leaves the factory is covered by insurance for protection of the ultimate buyer. The cost of this policy is included direct in the price of the car."

NEW GARDNER DEALERS

ST. LOUIS, July 25.—New dealer names recently added by the Gardner Motor Co., Inc., include: Danford Motor Co., Quapaw, Okla.; Conner-Hoxsey Auto Sales Co., Taylorville, Ill.; Lehigh Garage, Shenandoah, Pa.; The Connell & McKone Co., Boston, Mass.; Herman Jones, Denver, Colo.

Alfa Romeo Wins European Grand Prix



Preparing for start of European Grand Prix race. Ascari, the winner, is seen to the right in car No. 2. Campari, second, is directly behind in No. 6.

SPA, Belgium, July 6.—(By mail.)—Antoine Ascari, automobile dealer at Milan, won the European Grand Prix here, driving a straight eight supercharged 122-inch Alfa Romeo car at an average speed of 74.46 miles an hour for a distance of 500 miles. Campari, on a sister machine, finished in second place 22 minutes behind the winner. No other cars finished the race.

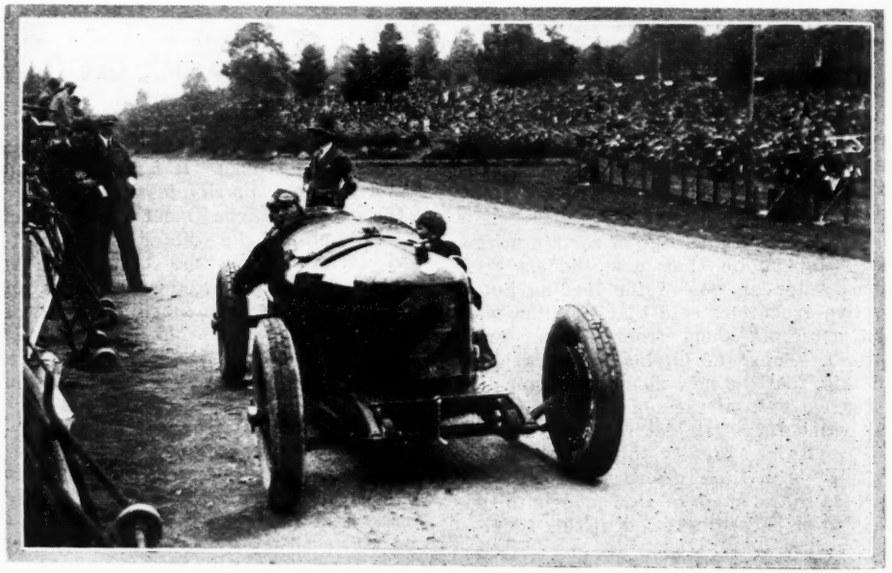
The European Grand Prix, which theoretically is the most important speed contest in Europe, was entrusted to Belgium this year and was run over a short hilly and winding road course in the neighborhood of Spa. Only twelve entries were received and only seven cars (three Alfa Romeos and four Delages) faced the starter.

All four of the twelve cylinder Delages, driven by Rene Thomas, Benoist, Divo and Torchy, were forced out of the race. In addition, one of the Alfa Romeos, driven by Brilli Perri, dropped out of the race after breaking a spring clip. The two Italians, Ascari and Campari, took the lead at the beginning and were never headed. Divo, who had a 1925 supercharged Delage, attempted to catch the Italian cars and set up a lap record at 79.4 miles an hour, but immediately after this Ascari spurted up to 81½ miles for a lap.

Rene Thomas dropped out after his car had taken fire and he had been slightly burned on the left hand. The gas tank on Benoist's Delage was pierced by a flying stone. The exact reason for the withdrawal of the two other Delages was not ascertained.

The failure of Delage to place a single car in a road race coming just one month before the French Grand Prix is a surprise and disappointment to French partisans.

Alfa Romeo used last year's cars rebuilt. These were designed by Engineer Jano, formerly with the Fiat Company, and have very much in common with the Fiat recently driven by Bordino in America. Up to half distance Ascari averaged 77 miles an hour, but when the Delages had been weeded out he reduced his speed, his average for the full distance dropping to slightly less than 74½ miles an hour.



Ascari stopping at pits during race.

Closeup view of Campari, who was second in big race

PARIS, July 27.—Antoine Ascari, Milan automobile dealer who drove the winning car in the Grand Prix d'Europe at Spa, Belgium, was killed at the Montlhery track here yesterday while driving in the French Grand Prix race. His car skidded at a turn after a drizzling rain had wet the track.

Parts, Accessory and Service Business Greater Than 1924

First Six Months of 1925 Show Steady Gain With June Decline Less Than Formerly

NEW YORK, July 25.—The business of automotive parts, accessory and service equipment manufacturers for the first half of 1925 ran substantially ahead of the same period in 1924, according to figures compiled by the Motor and Accessory Manufacturers Association.

A large number of representative makers of products sold to the motor car and truck manufacturers, the wholesale and retail trade and the motoring public reported an average increase in the wholesale value of their shipments to customers substantially in excess of the first six months of last year. The same companies reported that their plants had operated at an average of 83 per cent of capacity during this period and were operating on July first at 79 per cent of capacity.

Sales reports for June, also compiled by the association, showed a considerably less than normal seasonal decline from the high levels of April and May. The M. & A. M. A. index of sales for June stood at 158 per cent of January as compared with 165 per cent of January in May.

By divisions of the industry the index showed sales of units, parts and accessories to motor vehicle manufacturers in June 164 per cent of January sales as compared with the May figure of 174 per cent of January sales. Replacement parts sales to the trade in June were 129 per cent of January sales as compared with 134 per cent in May, accessory sales to the trade were 172 per cent of January as compared with 173 per cent in May and maintenance equipment sales showed a gain, aggregating 150 per cent of January as compared with the figure of 146 per cent.

Reports of sales by automotive jobbers throughout the United States and Canada showed a gain for the first half of the year over 1924 and a substantial advance in June over business of June a year ago. The jobbers' June business ran ahead of May in 13 of the 18 wholesale territories.

CANADIAN TIRES ADVANCE

TORONTO, July 25.—Owing to the apparent scarcity of raw materials in the rubber products industry, local prices on automobile tires and tubes have again been advanced. This advance affects all styles and sizes. On the smaller tires, the advance has been in the neighborhood of 3 per cent, whereas on the larger sizes the advance amounts to approximately 8 per cent. An advance is also effective on tubes to the extent of from 3 to 5 per cent. The market remains decidedly strong, as American markets have had much larger advances than have taken place in Canada.

Women Found to Excel as Drivers

WASHINGTON, July 25.—Women excel men as automobile drivers, it has been established by the American Automobile Association following a series of tests just carried out here by scientists and psychologists.

In these tests, conducted by Dr. F. A. Moss of the Institute of Government Research and one of the leading psychologists of the country, and assisted by H. H. Allen of the Bureau of Standards, women have uniformly scored higher averages as regards those qualities essential in a good driver.

Two of the tests in which the women outscored the men are of particular importance because they are among the primary factors that constitute driving ability. These are: First, the speed with which the driver reacts to danger and takes steps to avert it, such as applying the brakes. Second, the consistency with which the driver responds in such a situation.

Not only did the women show a quicker reaction time but they were also less variable. The average reaction-time of ten college women examined was 0.56 seconds, while that of twenty-five men from the same institution was 0.59 seconds. The mean variability of the ten women students was 0.17 seconds, while that of the twenty-five men students was 0.22 seconds.

K-D PLANT EXPANDS

LANCASTER, Pa., July 25.—The K-D Manufacturing Company, makers of automotive tools, has completed additions to its plant here which will double its output facilities. Another story has been added to the main building and two new buildings, a warehouse and parkerizing plant, have been added. The company was organized five years ago with one product, the K-D parallel jaw valve spring lifter. It then began the manufacture of K-D Britesteel Washers. Two new products which will be announced in a short time, have made it necessary to add the space.

NEW RECORD EXPECTED

DETROIT, July 25.—Willys-Overland dealers in the Detroit territory sold a total of 4,478 Willys-Overland and Willys-Knight passenger cars during the six months just ended, the figures including the sales registered in Detroit and Wayne county. During 1925, approximately 5,555 passenger cars of the above make were sold in this territory, 1,077 more than were sold during the last six months. Orders already booked and prospects assured make it seem likely that the sales in this territory for the year will establish a new high sales mark.

Rubber Manufacturers Urge Aid of State Department

Leaders of Industry Ask Secretary Kellogg to Make Representations to British

WASHINGTON, July 25.—Secretary of State Kellogg was asked this week by a delegation of American rubber manufacturers to lend his assistance to their efforts to break the British rubber monopoly.

In the delegation were Frederick Hood, president of the Hood Rubber Company, A. L. Viles, manager of the Rubber Association of America and Edward B. German, president of the Dunlop Tire and Rubber Company.

Great Britain has a restrictive policy which permits rubber planations within its dominions to produce only 65 per cent of their rated capacity. Reduced production has resulted in rapid increases in rubber prices, making it difficult for American manufacturers to buy rubber at a reasonable figure. They want Secretary Kellogg to make diplomatic representations to Great Britain to lift the ban on production.

The Department of Commerce, by direction of Congress, is now investigating rubber culture throughout the world with a view to developing fields outside the areas controlled by the British. Congress appropriated $500,000 for this inquiry.

The conference of the rubber leaders this week with Secretary Kellogg is taken as the opening shot in the long expected fight between British and American interests for control of crude rubber supplies, with indications that tropical areas throughout the globe would be economic battlefields during the next decade.

NEW VELIE DEALERS

MOLINE, Ill., July 25.—New dealers announced by the Velie Motors Corporation recently include:

Barney Wetzel, Sterling, Ill.; Hubert Motor Sales Co., Tipton, Ia.; E. E. Boynton, Camden, Me.; Newburyport Motor Co., Newburyport, Mass.; C. W. Boak, Yakima, Wash.; Williams Mtr. Service Co., Inc., Elizabethtown, N. C.; Rone H. Lewis, Whiteville, N. C.; G. E. King, Dublin, N. C.; Mrs. E. D. Morris, Everett, Wash.; George Hillerege Auto Paint and Upholstery Shop, Scottsbluff, Neb.; W. A. Helsdon & Son, Byron, Ill.; Sloan's Garage, Gloucester, Mass.; E. E. Burkett, Union, Pa.; Milton Fairley, Laurinburg, N. C.; W. L. Moore, Smithfield, N. C., and J. W. Turnage, Dunn, N. C.

FIRST AUSTRALIAN SHIPMENT

FORD CITY, Ont., July 25.—The S. S. John C. Howard has loaded 1,100 Ford cars, trucks and tractors at the Ford company's docks in Ford City, Ont. This shipment is part of the first consignment to the company's new $12,000,000 assembly plants now being erected in Australia. It is also the first time the docks have been used for exportation purposes.

Radically Different Car Is Found in New Cadillac Offering

(*Continued from page* 19)

is located at the right end of the cross shaft at the front and the oil pressure regulator is placed back of the right cylinder block. The capacity of the pump has been enlarged materially so that the overflow at low engine speeds is great. Oil is delivered under the desired pressure to all of the cam and crankshaft bearings by copper tube manifolds, drilled holes in the crankcase and the crankshaft. The overflow which leaves the oil regulator is passed through a Purolator oil filter located on the front of the dash. Due to the large capacity of the pump with consequent liberal rate of flow through the bypass at the pressure regulator, the rate of filtering of the entire oil supply is very high.

Increased Power in Engine

These provisions have resulted in an engine which has increased power and flexibility with longer life and at the same time which is more simple and accessible. In rounding the program based on this ideal, the dia. of the exhaust valves has been reduced 1/8 in. to 1 9/16 in. dia. while the cone type valve springs are made somewhat lighter and are reversed. The length of valve stem guides has been reduced and these no longer project into the ports. Both inlet and exhaust valves are made of silico-chrome steel in place of the former tungsten.

With the new arrangement of the flywheel a steel band in which the crown gear teeth are cut is pressed over a cast iron center member and held in place by dowel screws. The center flywheel member and the outside ring of the multiple disk clutch are integral. Where the former construction involved six inserted keys for driving the clutch disc, 45 gear teeth are cut into the new integral member and the periphery of the clutch dics has been modified accordingly. Both the clutch and brake pedals are mounted on a common shaft which is fixed in a bracket that is bolted to the side of gear case.

Within the gear box but few changes have been made, the chief of which is the simplification of the interlocking system by substituting one spring loaded ball for two plungers and a ball. The pilot bearing at the front end of the clutch shaft is a Hyatt roller running direct in the rear end of the crankshaft. An aluminum cover which forms part of the floor board trim has been added to the gear box cover. No change is made in universal joints although the lubrication method has been modified for greater accessibility. Instead of the customary tapered screw plugs which are threaded into the steel protecting shell of the joints, Alemite fittings are located on the end of the propeller shaft adjacent to the joints and drilled leads conduct the lubricant to the working surfaces.

The torque arm has been shifted from the right to the left side of the propeller shaft and the ball and spring assembly at the front has been replaced by a rubberized fabric member.

Gears in the rear axle continue as formerly and while the bearing layout on the pinion shaft is identical, two radex bearings have been substituted at the differential mounting for the previous single row and two annular combination. At the outer ends of the live axles comprising the full floating construction, fourteen generated teeth have supplanted the former lug and slot arrangement. With the change to semi-elliptic springs at the rear end, the spring pads are now riveted to the axle housing instead of being swivelled. Here again the possibility of noise is elimated and the new construction decreases the stress on the torque arm by imparting some of the driving reaction to the springs.

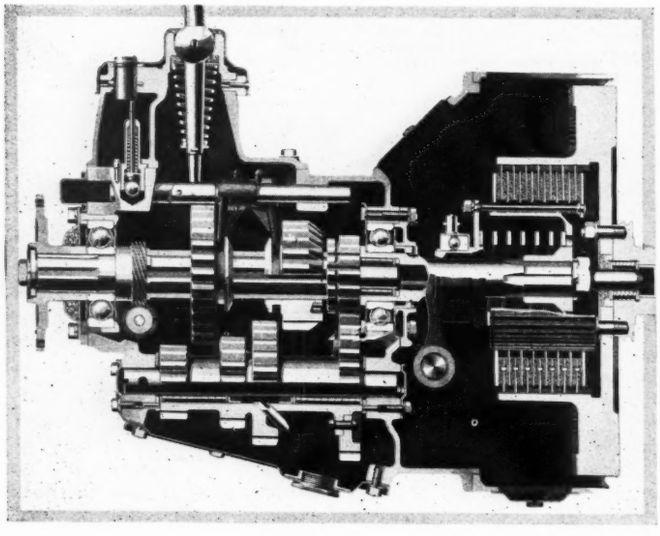
Although the spring suspension is changed, frames, with the exception of a decrease of 1/32 in. in thickness, making this figure 5/32 in. are identical with the frames of the last series. More than 30 lbs. were cut off by this change.

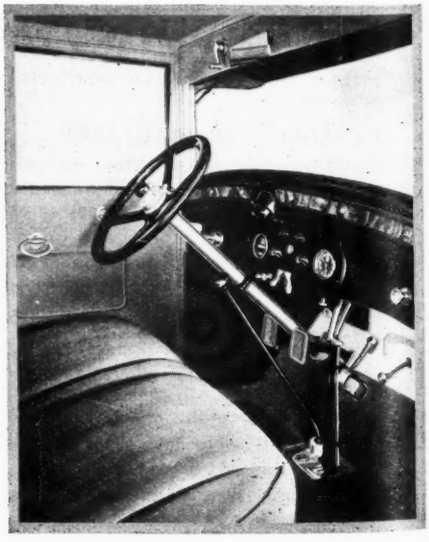
The additional drop required for the elliptic springs was obtained in the forged spring horn. While the front of the rear springs, which are 60 in. long, is attached at the conventional pin and bushing the rear end is shackled with pins above and a ball joint below at the spring horn. It is stated that this ball joint construction allows the same riding comfort as the older platform spring arrangement and makes for longer life of spring bushings. While the rear springs are 2 1/4 in. wide, the front spings have a width of 2 in. and a length or approximately 42 in.

Mufflers and exhaust pipes are substantially like their immediate predecessors. While the tire carrier continues at the back the lamp combination has moved to the left rear fender. Both the battery and tool box have been removed from inside of the frame and now are located in metallic boxes which are set in the rear ends of the front fenders and enclosed by locked lids. The battery which has a capacity of 130 amp. hrs. is enclosed in a composition rather than the usual wood case.

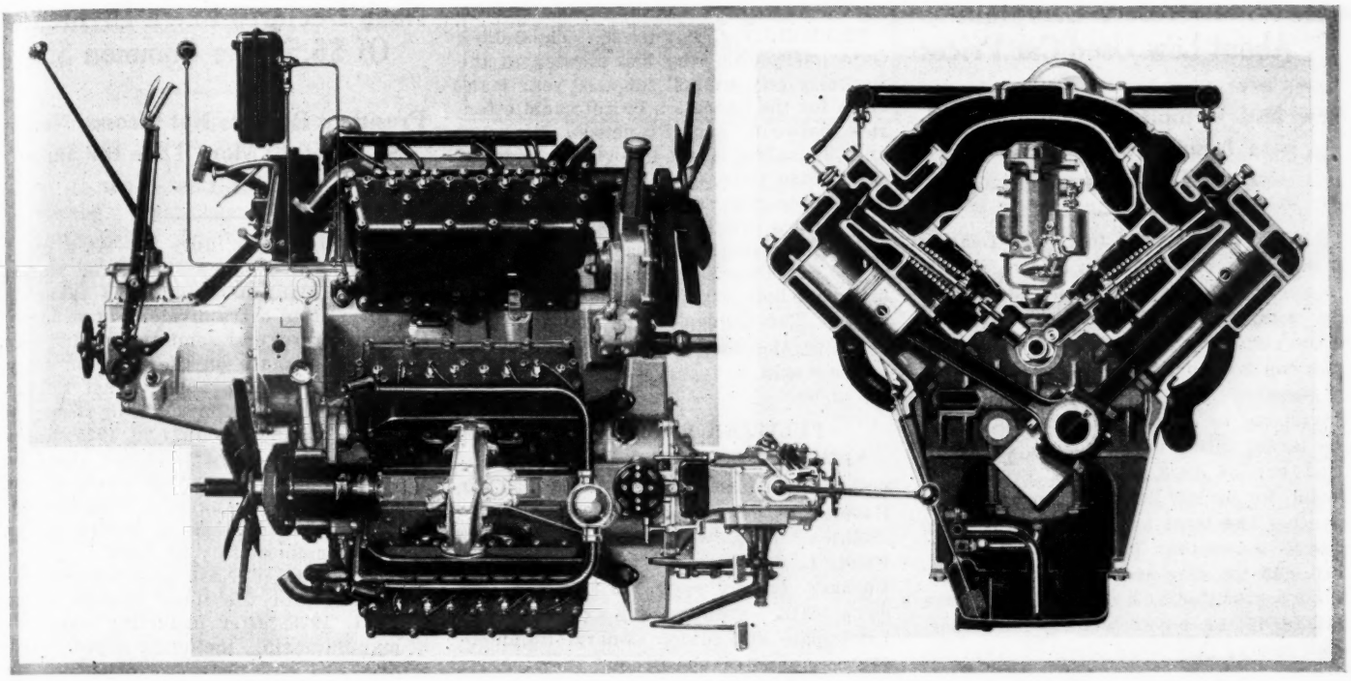
Braking Ratio Effort Modified

Brakes have been subject to little or no change. The ratio of braking effort has been modified to exert slightly greater pressure in front and with this change, the rear service brake bands have been made of hard brass so the feature of thermal equalization will be maintained for longer periods under the conditions of greater load at the front end. Adjustment within the rear internal or emergency brakes has been eliminated by modifying the toggle mechanism which operates the band so that it has capacity to operate the brake up to the full thickness of the band.





Left: Cross section of Cadillac clutch and transmission showing the crown gear on flywheel and Hyatt bearing in rear end of crankshaft; right: Driving compartment of the new Cadillac, showing walnut panels and ventilating windshield



Upper left Cadillac engine showing the arrangement of the single water pump and oil filtering device. Immediately below is a top view of the engine showing the clean trough between the blocks. Right cross section showing tappet arrangement, combustion space and new intake manifold arrangement as well as the trunnions for main bearing studs

All electrical wiring on the entire chassis is enclosed in armored conduit and all of the connections between the chassis and body are made at a junction box located on the front of the dash. The automatic cut-out which formerly was on the hidden side of the instrument board also has been moved to the front of the dash. The horn has been removed from under the hood and now is located on the left headlamp bracket. Instead of the former tilting headlamp reflectors, two filament bulbs controlled from the dash switch are used now for dimming. Auxiliary lamps of 3 c. p., also located in the drum headlamps are used for parking. A cigar lighter on a 12 ft. cord is located on the instrument board and may be removed to allow connection with a trouble lamp which is located on the front of the dash.

An interesting feature is the electrically operated gasoline gage. Due to using the pressure feed system for supplying the carbureter, none of the remote type of gasoline gages can be used. In conjunction with the Nagel Electric Co., Cadillac engineers have developed an electrical gage of the potentiometer type. The actuating element is interconnected with a float in the gasoline tank and connected by a single line of wire to the gage on the instrument board. The current consumption is in milli-amps. and 80 days would be required for the gage system to run the battery down. This interval eliminates any question of the effect of the electric gage on the battery. With the installation of a reliable gage on the dash, the emergency compartment in the gas tank has been eliminated although the capacity continues at 20 gallons. The gas tank drain has been placed at the back in conjunction with the sediment cup.

Another refinement is found under the hood as the front of the dash and the engine are finished in Duco and therefore easier to keep clean. The adjustment of the steering gear has been made more accessible and the steering column and worm may be removed without tearing down the steering gear housing.

Mechanical and Body Changes in New Buicks

(*Continued from page 23*)

tween the ends of the bands. Hexagon head brass cap screws at the brake anchor add greatly to the ease in making adjustments. The outer universal joints on the front brakes are now covered with leather boots.

Tubular Cross Brace

To increase the frame stiffness at the forward end of the Standard Six chassis, a tubular cross brace is used in place of the "U" section member at that point. Body brackets are added to the sides of the frames and are located under the main sills of the closed bodies on both chassis. This design allows better support for the bodies and makes the hold down bolts more accessible.

Easier steering on the Master Six has been achieved by adding 7 per cent to the steering gear reduction, the rolls on the yoke shaft having moved further apart on the larger model, while on the smaller car the diameter of the wheel has been enlarged from 17 in. to 17½ in. On both steering gears, a heavier wall is provided under the worm on the steering tube while the steering worm key is integral with the worm instead of a separate part used to lock the worm to the tube.

Special bosses for centering the rims on the new 21 in. wider spoked wheels are provided which in connection with the new special type rim wedges provides a better support for the rim on the wheel and insure a very rigid and positive mounting. On the Standard Six model, the hub flange and bolt circle are longer in diameter by ¼ in., with the hub caps larger in size to correspond with the new hub flanges.

All body wheels on the Standard Six chassis are finished in Buick Gray with red striping, while the upper portion of the closed bodies is in black duco. Both open models are upholstered in genuine long grain bright finish leather, having the door, cowl, coverings, etc. finished in a material to match. A special pattern taupe plush is used for the seats and backs and a plain plush of the same quality and color is employed for the body sides and headlining on the closed models.

Color schemes on the Master Six are similar in many respects to those on the smaller car. Both five passenger sedans and the two regular open models are finished the same as the Standard line. The four-passenger coupe and the seven-passenger sedan are done in lotus blue with striping to match, while the brougham sedan and country club coupe are finished in two-tone effect, employing Texas brown below the moulding and light Texas brown above. The two open sport models are offered with two duo-color options, the first being two-tone Buick blue with natural wheels and the second Texas brown with wheels to match. With the exception of the two five-passenger sedans upholstered in the same manner as the Standard

(*Continued on page 39*)

California Dealers Complain About Low Used Car Prices

New and Rebuilt Automobile Business Injured by Extremely Easy Time Payments

SAN FRANCISCO, July 25.—Dealers in new cars of all makes and in rebuilt used cars of the higher-priced models are complaining throughout California of the ruinously low prices at which used cars can be bought on time payments. It is possible now in Los Angeles, San Francisco, or practically any other of the larger cities in California, to buy a used car of 1922, 1923, or even 1924, model, for as low as $50 down and $20 a month. The total price on each of these cars is lower than it ever has been before, and the cars are being sold "as is," to be overhauled and rebuilt at an extra charge. if the buyer wishes, but otherwise just as they were received from the previous owner.

This condition applies largely to cars selling new at $1500 or less delivered on this coast. Dealers in "as-is" used cars have sprung up like mushrooms all over California, and are cutting noticeably into the sales of dealers in new cars in rebuilt used cars. The price-range on these cars, which are sold entirely at buyer's risk, runs from $100 to $300, and the current arrangement is 15 per cent down and the balance in 20 equal payments, with interest at 8 per cent.

Hundreds of these cars have been bought by comparatively low-salaried workmen and others, who make the first payment, possibly cover the first monthly payment, use the car for two months on vacation in the mountains or running it up and down the coast, and then return it to the vendor. This amounts merely to a constant turn-over of used cars, and, in addition to increasing the sales-resistance for new as well as rebuilt cars, keeps the market flooded with low-grade used cars.

One used-car dealer in Oakland sold the same car, for which he orginally paid $150, five times in the past year. His original price on the car was $300 on which he received $45 and $12.75. His second price also was $300, on which he was fortunate enough to get $45 and two months' payments, $25.50. His third sale was for $250 and he obtained $37.50 and $10.65. His fourth sale was for $200, on which he received $30 and $8.50, while his fifth sale was for $100 cash. Interest he collected is not included, but he had received approximately $315 net for a car which cost him $150, and the interest he garnered, probably around $20, paid for the costs of getting back the car in each instance. This is only an average example; there have been scores and hundreds of cases in which profits as high as 500 per cent have been made on one used car of good external appearance.

TRIANGULAR FERRY PLANNED

BERKELEY, Cal., July 25.—The Golden Gate Ferry Company has applied to the Berkeley city council for a 50-year franchise for the operation of automobile ferries between San Francisco, Berkeley and Sausalito, at the northern side of the Golden Gate, and thence back across the Gate to San Francisco. This triangular service would open both mainland areas of northern and eastern California to the San Francisco dealers and shorten distances both ways by something like 15 miles. The Golden Gate Company now operates the largest automobile ferries in the world.

PULITZER RACES OCT. 10

NEW YORK, July 25.—E. O. McDonnell, president of the New York 1925 Air Races, Inc., has announced that the national air races will be held at Mitchell Field, L. I., October 8, 9 and 10. The Pulitzer Trophy race will be the last day's feature event. Army air forces will participate and Major General Summerall, commanding the Second Corps Area, has pledged his cooperation. The present speed record for the Pulitzer Trophy is 243 miles an hour, but it is expected this will be bettered by more than twenty miles an hour by three planes being built by the Curtiss Co. On a straight course they may travel 300 miles an hour.

Nash Declares Extra Dividend Of $6.50 Per Common Share

President Reports Net Income Nearly $3,000,000 More Than for Same Quarter Last Year

KENOSHA, Wis., July 25.—At a meeting of the directors of The Nash Motors Company dividend action was taken in the form of an extra dividend of $6.50 per share and a regular semi-annual dividend of $3.50 per share on the common stock of the company, payable August 1, 1925, to holders of common stock of record at the close of business July 20, 1925; and a quarterly dividend of $1.75 per share on the outstanding preferred stock of the company, payable August 1, 1925, to holders of preferred stock of record at the close of business July 20, 1925.

President C. W. Nash reported that the net income for the three months ended May 31, 1925, after deducting expenses of manufacturing, including depreciation, selling, and administrative expenses and local, state and federal taxes, amounted to $4,193,850.11 as compared with $1,501,000.35 for the same period a year ago.

The value of sales for the three months of this year shows an increase of 100.5 per cent over the corresponding quarter of 1924.

25 Years Ago In the Automobile Industry

As Recorded In MOTOR AGE

(From MOTOR AGE of August 2, 1900)

Rain Interrupted the Meet

Charles S. Henshaw ran the first outdoor automobile tournament ever run in America on Thursday afternoon at Branford, Conn. The track was the half-mile dirt horse track belonging to Louis A. Fiske of New Haven, who backed Henshaw to the extent of $800 for the affair. The first day's races, which were somewhat of a success, consisted of the trial heats. There were about 1,500 people present at $1 a head and the day's sport was somewhat marred by the collapsing of a large tent used for exposition purposes injuring a few people. To wind up the day a heavy rain fell, which continued all the next day and the tourney was called off to some indefinite period.

New Buffalo Concern

Arrangements have been made by John R. Keim to devote a portion of his extensive plant at Buffalo to the manufacture of automobiles. The factory was formerly owned by the Spalding Machine Screw Co., and has been devoted principally to the production of cycles and cycle parts, and is one of the best equipped in America.

Derelictions Bring Fines

Springfield, Mass., July 30.—Millionaire owners of automobiles who are passing the summer at New England resorts have occupied valuable space in the newspapers the past week. Society had scarcely ceased to discuss the $15 fine which was imposed upon one of the Vanderbilts for operating his automobile at a higher rate of speed than a Massachusetts constable approved of, when William H. Bradford, a millionaire who summers at Lenox, Mass., was summoned into court for riding his automobile on the sidewalk. Mr. Bradford's counsel explained in court that the highway was in such poor condition that he appropriated the sidewalk. The court decided that the saving to the tires of the automobile was worth $5.

May Not Cross Ferries

New York, July 30.—The Automobile Club of America Law Committee, of which President Chamberlin is a member, is now in correspondence with United States Supervising Inspector General Dumont, with a view to inducing him to modify his recent decision in the Jamestown (R. I.) Ferry Co. case in which he held that vehicles using gasoline directly or indirectly came under the ban of section 4472 of the U. S. Revised Statutes, forbidding the carrying of combustibles in steam or ferry boats run on navigable bodies of water. Under this strict ruling a gasoline vehicle or steam vehicle using gasoline or fuel could not cross a ferry.

Buick Announces New Models

(Continued from page 37)

Six bodies, all closed cars are finished in the interior with a rich mohair plush in color to match the exterior.

On the two sport cars, the collapsible top is carried in nickelplated brackets which are used when the top is down. These brackets are carried loose in the cars and when in use are inserted in holes at the top and back of the outer end of the seat frame.

Additional items of equipment included as standard on all cars on both chassis are: rear view mirror, windshield wipers, those on the closed cars and the two sport models being of the automatic type, cowl or windshield ventilators, sun visors, transmission locks and door locks on all closed cars.

Heaters are provided only in the two coupes, seven passenger sedan and brougham sedan on the Master Six chassis. In addition to being fitted on these models, aluminum scuff plates, front snubbers and dash gasoline gages are also supplied on the two sport cars.

Combination vanity and smoking sets are included on the Master Six four passenger coupe and seven passenger sedan while a smoking set is carried on the back of the front seat on the brougham sedan. These three cars are also provided with attractive braided cords to assist the passengers when rising from the rear seats. Cigar lighters are only supplied on the two sport models.

Special ribbed rubber matting of new design and construction is used to cover the running boards on all models.

Radiator caps with attractive arms, motometer and lock are supplied on the same cars as are equipped with the dash type gasoline gage.

Gray Motors to Build Gas-Electric Drive Bus

NEW YORK, July 25.—Preparations are being made for the production of the Tilling-Stevens Gas-Electric Drive Bus, by the American National Omnibus Corp. of New York, as a result of the reorganization of the Gray Motors Corp. of Detroit. It is understood that the Gray Motors plant will be utilized for bus production, along with the automobile activities of the company.

An official statement is expected from E. M. Howe, president of Gray Motors, in which the reorganization will be described in detail. Meanwhile it is learned at the New York offices of H. H. Melville, president of the American National Omnibus Corp., that a number of the buses will be on display at the American Electric Railway Association Convention at Atlantic City, October 5-9, and that deliveries will commence November 1.

Three types of buses are under production—the single deck pay-enter city type; fully enclosed double deck city type, and super de luxe touring. They are being built under the patents of the Tilling-Stevens Motors, Ltd., of England.

Ignition Condensers

(Continued from page 14)

"The paper used is either glassine which is a crinkly waxed paper, or else soft paper is used, which is afterwards treated in a vacuum to draw out all moisture and then in hot wax to thoroughly fill up all spaces in the paper and give it great insulating strength, for the paper in the condenser must resist not merely the battery voltage but the inductive kick voltage of the primary winding which may be from 100 to 200 volts or more.

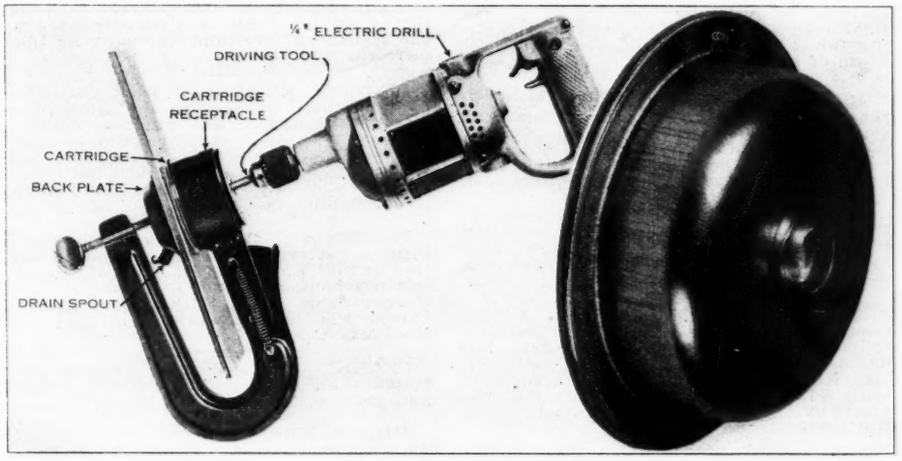
Testing Condensers

"If you wanted to test a spring, you would load it down and then release it to see if it would spring back in good shape. The condenser is tested in similar manner. First you load it electrically by means of the 110 volt test points. Then with the points still in contact with the condenser terminals you slide one along until it touches the other. This permits the charge in the condenser to get away, the two condenser terminals being shorted, and at the same time the lamp lights up. The sign of a good condenser is a snappy spark which makes a cracking sound like a small whip. Another way of testing is to remove the 110 volt points and then short the condenser terminals with some metal object as a screw driver blade. The trouble with the latter method is that a condenser which is slightly leaky (not shorted) will not hold its charge long enough to give the characteristic spark, although satisfactory when put into service."

DAKOTA STATIONS TO REOPEN

PIERRE, S. D. July 25.—At an emergency meeting of the state gasoline board it was decided to reply to the advance by the Standard Oil Co. of 1 cent a gallon on gasoline by reopening the state stations in Aberdeen, Brookings Huron, Madison, Mitchell and Rapid City, and starting new ones in Kennebec, Armour, Leola, Selby, Webster and Woonsocket. The old stations were closed only a few weeks ago, when their purpose was accomplished.

New Windshield Cutter



The set-up used in connection with drilling a hole through the windshield glass with the Fyrac method. Right, cartridge which contains grinding compound and water. The slot is for insertion of drill chuck

The Fyrac Manufacturing Company, makers of the Fyrac Night Guide, and the Clymer Manufacturing Company, manufacturers of the Clymer Safety Light, both of Rockford, Ill., have perfected a new and patented method of cutting a windshield, which consists of a cartridge placed against the windshield glass, the cartridge containing the windshield cutter, and the mixture of cutting compound, water and everything necessary to make the 2-inch hole through the glass. One of the cartridges is contained in each carton, which holds the light, and the cartridge, when used, is thrown away.

The new process is simple. The cartridge holder, a "u"-shaped tool, is adjusted on the windshield so that the cartridge receptacle is on the side from which the mechanic drills. The backplate is on the opposite side of windshield and is tightened to the glass by a thumbscrew. The driving tool is then inserted in slot in cartridge through the hole in back of the cartridge receptacle.

The end of driving tool is inserted in the chuck of a quarter-inch electric drill and the power turned on, with the result that a clean 2 inch hole is drilled in a few minutes. So thorough has been the work of devising this new process that even the escape for the used mixture of cutting compound and water is provided in a spout in the backplate on which hangs a tiny pail during the operation. A rubber pad within the backplate, by "the feel," tells the mechanic when the hole is cut.

Along Automobile Row

BALTIMORE.—Herbert M. Hartman, president of the Fidelity Motors Company, distributors, has announced the appointment of the Wienhold Motor Company, as sub-dealer in Chrysler and Maxwell cars. John T. Wienhold is president of the Wienhold Motor Co.

MILWAUKEE.—G. J. Zinke has been appointed retail salesmanager of the Milwaukee Flint Company according to an announcement just made by that company. Mr. Zinke has been proprietor of the Zinke Auto Co. of Cudahy, Wis., a Milwaukee suburb, for many years.

ST. LOUIS—Cleveland-Downer Motor Sales Co., Cleveland dealer has opened a new building at 5628 Gravois Ave. It was formerly located at 4618 Delmard Blvd. The Cleveland-Downey Co. will continue to handle the Cleveland in its new establishment and has also been granted a dealer franchise for the Chandler car by the St. Louis distributor, Lewis Automobile Co.

WATERLOO, Ia.—Frank L. Negus, formerly with the Central Iowa Motors Company in Des Moines, has been made manager of the service department of the Hupmobile agency here, succeeding Ray Dixon, advanced to the sales staff.

CHICAGO.—L. B. Massey of the Motor Transport Company of Minneapolis, has joined the sales force of the Diamond T Motor Car Company as district sales manager.

PORTLAND, Ore.—It is announced by officials of the company that the Elite Auto Repair Co., Chevrolet parts and service, has changed its name to the Bankhead & Walter, Inc., and is arranging for larger quarters on account of the press of business.

ASHEVILLE, N. C.—The new home of the Sawyer Motor Company, dealers in Dodge Brothers automobiles, is nearing completion. The new garage will have a concrete roof for day storage and total floor space is more than 45,000 square feet.

DESERONTO, Ont.—R. H. Raynor of Picton, Ont. has recently taken over the property and business of the Riggs Motor Sales. Riggs has been handling Jewetts, Studebakers and Paiges.

DALLAS, Tex.—The Ferguson Motors Company, Hudson-Essex dealers and distributors in Dallas and territory, has named W. J. Roberts wholesale manager. Mr. Roberts was previously associated with Adam E. Ferguson, president of the company, in the automobile business in Northern cities.

LOS ANGELES.—Charles G. Darrach, Jr., former wholesale manager of the Walter M. Brown Motors, Inc., Los Angeles, has joined the sales department of the W. P. Herbert Company, Southern California Chandler and Cleveland Six distributors.

DES MOINES, Ia.—L. B. Chase, since 1907 associated with the Des Moines Buick company, has severed his connections with the firm to become manager of the new American Gear company branch in Kansas City.

CHICAGO.—Lester Rich, formerly sales manager for the Bird-Sykes Company, Paige-Jewett dealers and distributors, has become retail sales manager of Community Motors, Inc., Oakland dealers.

CHARLOTTE, N. C.—Thomas L. Craig Motor Company, of Gastonia, N. C., has relinquished the Willys-Knight and Overland lines and has closed a contract with Hoppe Motors, Inc., distributors, for a Chrysler dealership.

ST. LOUIS.—Southwest Nash Motor Car Co., Nash distributor for the St. Louis district, has announced the appointment of the West Side Nash Co., a new organization as an authorized Nash dealer. William J. Wolff, formerly of the South Side Nash Company is president of West Side Nash.

TOLEDO.—The U. N. Auto Parts Co., has been chartered with a $20,000 capital to retail new and used autos, parts and accessories.

BALTIMORE.—The Shelton Garage, Inc., 2005 North Charles Street, Baltimore, has been incorporated with $50,000 capital stock to hire and store automobiles. The incorporators are Charles M. Green, Frank J. Rowe and Paul B. Mules.

CHICAGO.—Harry M. Reid has sold his interest in the Reid-Burton Motor Company, Ford agency, to Thomas W. Burton. The firm name will remain the same.

LOS ANGELES.—The Star Motor Company of California announces the appointment of The McLean Motor Sales Company as Star dealers in Glendale, Eagle Rock and Burbank. R. A. McLean is president of the company; L. V. Freeman, vice-president of the company; R. T. McLean, secretary.

DETROIT.—Hubert W. Roberts, formerly vocational director of the schools at Anderson, Ind., has resigned to become director of personnel at the Olds Motors Works under the direction of I. J. Reuter, president and general manager.

CINCINNATI.—Papers have been filed with the secretary of state, chartering the Vine & Clifton Auto Sales Co., with a capital stock of $50,000 to deal in motor vehicles and accessories.

LOUISVILLE.—Browder and Hoskins, Chevrolet dealers, have recently moved their used car department from 210 East Walnut Street to 125 West Chestnut Street, in the building formerly used by the Kentucky Overland Company as their used car department.

LINCOLN, Ill.—Marvin Richardson has sold his half interest in the Richardson Motor Company to his partner, John L. Gordon, who will continue the business alone. Temporarily, Mr. Richardson will remain as salesman. The firm will continue to distribute Studebaker cars in the Logan county territory.

BALTIMORE.—E. E. Starkey, who maintains a battery and electrical service station at 3401 Reisterstown Road, Baltimore, has opened a branch station at 2638 Pennsylvania Ave. William Linker, long experienced in this work, is in charge of the branch.

OZARK, ARK.—W. H. Mason has bought half interest in the Ozark Peoples garage.

MILWAUKEE.—Removal of the Scherer Automobile Company, formerly known as the Janesville Buick Company, from its old quarters to a large new garage has been completed. Gerald O. Scherer, manager of the Janesville Buick Company, will continue as manager of the firm under its new name.

CHARLOTTE, N. C.—W. A. Masterman, vice-president and general manager of the B. D. Heath Motor Company, distributor of the Hudson-Essex line of passenger cars and one of the important automotive trade establishments of this city, has resigned, it was announced.

BOSTON.—A new company formed here called the Stone Motors, Inc., to take over the selling rights of the Yellow Cab trucks, has leased salesrooms in part of the showroom vacated by the defunct Sterling Knight Motor Company of New England.

HOUSTON, Tex.—The franchise for the Hudson-Essex cars here has been divided. The new agent is the Alex Clark Company of which Alex Clark is president. The A. C. Burton Company, Hudson-Essex dealers in Houston for years, will continue handling the Hudson-Essex lines.

MONTREAL.—Franklin Motors, Ltd., has moved its office and showroom to more central and commodious quarters at 377 St. Catherine Street, West.

NEW BEDFORD, Mass.—The Ricketson Motor Car Company, dealer for the Rickenbacker car and the Federal truck in southern Massachusetts with salesrooms and service in New Bedford, has signed a contract to handle the Flint in the same territory.

CHARLOTTE, N. C.—J. Ray Barkalow, sales manager of the Lincoln department of the Etheredge Motor Sales Company, of Charlotte, has resigned his position to accept the position of wholesale sales manager of the newly organized Hoppe Motors, Inc., of Charlotte, which corporation has taken over the distribution of the Chrysler line.

SPOKANE, Wash.—Announcement is made by the Eldridge Buick company of Spokane and Seattle, that a contract has been awarded to Alloway & Georg of Spokane to erect a modern automobile sales and service building here, estimated to cost $120,000.

MONTREAL.—The Brooks Steam Motors, Ltd., has just installed a showroom in the Keefer building formerly occupied by Benson-Manley, Ltd.

BOSTON.—William R. Davis and Eliot B. Ware, who now handle the Pierce-Arrow in Boston have perfected their organization with Mr. Davis president and Mr. Ware treasurer and general manager, retaining the name J. W. Maguire Company.

MOUNT MORRIS, N. Y.—One of the largest transactions in Livingston county real estate was closed this week when the Mount Morris Ford Garage, Inc., including the real estate and stock, was sold by W. B. Sanders, of Nuda, acting for Henry McIlravy, president of the corporation, to the Mount Morris Sales Corporation. The new owners plan to greatly improve the property and garage service. They will build a new showroom and make a number of changes in the interior of the building.

DETROIT.—The Piston Service Company, Inc., of Detroit has opened a branch station in Flint. H. Parker has been placed in charge with F. H. Smith as district salesman. The office will serve the country in and around Flint with piston rings, bearings, and other parts of standard motors for all makes of cars.

MONTREAL.—Studebaker is now occupying a down town showroom in the heart of the financial and business district in the Insurance Exchange Building where they have ground floor showrooms with plate glass show windows.

ROCHESTER, N. Y.—A. W. Martin and George H. Strickland, prominent in automobile circles here, recently purchased the Standard Auto Tire Works of 24 Windsor Street. The new owners will retain the name of Standard Auto Tire Works and the same personnel.

PORTLAND, Ore.—The C. L. Boss Automobile Company, exclusive distributors of Star and Durant cars, has taken a lease of a new building which will give the organization 18,000 square feet of additional store space. Two dealers have recently been added. At St. Johns, Ore., Brown and Dulen will handle Star and Durant cars, and the same lines will be handled by Repyard and Dorris at Milwaukee, Ore.

CHARLOTTE, N. C.—Organization of Hoppe Motors, Inc., by W. T. Hoppe and dissolution of firm of Knight-Overland Company, of which Mr. Hoppe was the executive head is announced. Mr. Hoppe also announced that he had relinquished the Charlotte dealership for the Willys-Knight and Overland lines and has been given a distributor's contract by the Chrysler organization.

BUFFALO, N. Y.—Rollin Buffalo Corporation of Buffalo, S. Lee Abrams, president, has been given the Rickenbacker franchise for Buffalo and territory.

CHICAGO.—The Husky Wrench Company of Milwaukee has moved its Chicago office, formerly located at 189 N. Clark Street to 610 Sycamore Street, Milwaukee, it is announced.

With the Associations

Plan Discount Elimination

LOS ANGELES, July 25.—The Los Angeles Automobile Trade Association is conducting an intensive educational campaign among its members to eliminate the "discount-to-customer" evil which has become increasingly prevalent throughout Southern California.

In a recent bulletin to members, the executive officers of the association declare that a condition created by the automotive merchant has brought the mind of the ordinary consumer of automobile supplies to a position where it is considered sacrilegious to pay the list price for anything purchased for an automobile.

"The plan," says the bulletin, "works about like this: A good customer comes into your place of business and makes a statement that he is about to have his car painted, buy a camping outfit, get some spotlights or purchase some piece of equipment which you do not carry in stock.

"Immediately, because of the profit which you have made from your transaction with this customer, you are overcome with generosity and insist that the customer use your purchase order and in that way obtain your discount to which, by your very action, you prove you are not entitled.

"It does not make any difference what line of business you are in, somebody is issuing a purchase order enabling the customer to obtain your very line of merchandise at a discount.

"This thing must be stopped. The place to stop it is where the order is issued. If you must issue an order to a customer, forget the profit you have made off of your previous transactions with him. Send your call boy with the order, get the merchandise and sell it at list."

Greensboro Picked for Meet

CHARLOTTE, N. C., July 25.—The fall meeting of the North Carolina Association of Gasoline and Tire Dealers will be held at Greensboro, October 20-21, it was announced here by President Keely Grice, on his return from a conference of association officers at Greensboro.

An exhibit of supplies and equipment for automotive service stations will be on display during the convention.

Officers of the association are in accord that "something must be done to prevent jacklegs from operating service stations," it was explained, and this will be one of the important matters to come before the October meeting.

Carolina Used Cars Lower

CHARLOTTE, N. C., July 25.—A total of 14,560 used automobiles were in the hands of dealers in North Carolina June 30, according to an announcement by the office here of the Carolina Motor Club after completion of a census. These cars were estimated to be worth $3,281,233.20.

The census was made under direction of H. A. Rouzer, of Salisbury, chairman of the committee on trade methods and policies of the North Carolina Automotive Trade Association.

The association's statement said there are "a few more than 1,100 automobile dealers in this state" and added that "the used car situation in this state is not such a critical one."

Washington Association Elects

WASHINGTON, July 25.—Mark Lansburgh, secretary of Lansburgh and Brother, was unanimously elected president of the Commercial Motor Vehicles Owners' Association at a meeting in the City Club this week. He succeeds William Jorg, manager of the Corby Baking Company, whose resignation, because of his inability at the present time to take care of the many details of the position was accepted. A standing committee to confer with the district commissioners on traffic regulations as relating to trucks was provided for after several members had cited instances where their business was interfered with.

Louisiana Club Organized

NEW ORLEANS, July 25.—The Automobile Club of Louisiana has been opened with temporary headquarters on Baronne Street, New Orleans. The charter, filed recently, shows the following officers: Nat W. Bond, attorney, president; J. C. Barnes, New Orleans Public Service, Inc., first vice-president; Dr. G. F. Roeling, physician and coroner of the parish of Orleans, second vice-president; A. B. Nicholas, real estate dealer and president of the Young Men's Business Club, treasurer; Edgar Boutwell, former manager of the Motor League of Louisiana, secretary.

Besides providing many services for its members, the club will devote itself to promotion of good roads and to advertising Louisiana and its growing number of highways. It will concern itself with traffic problems of the city and state and also with all legislation, state and national, affecting the ownership of motor cars, the development of highways and the solution of traffic problems.

Tudor Heads Roads Bureau

SAN FRANCISCO, July 25.—William M. Tudor has been appointed manager of the good roads bureau of the California Automobile Association, succeeding A. E. Loder, resigned, according to announcement by D. E. Watkins, secretary and general manager of the association. Mr. Loder has resigned to accept an executive position with the Caterpillar Tractor Company. Mr. Tudor has been in the employ of the association for the last eight years.

Tax Reduction Urged

CHARLOTTE, N. C., July 25.—A campaign looking to the general revision of the policies of the North Carolina state government involving the automobile manufacturing and sales industry and of the laws directly or indirectly governing the operation of motor vehicles was launched here today by the North Carolina Automotive Trade Association, in an address by C. W. Roberts, of Greensboro, secretary of the association.

Emphasis was given by Mr. Roberts, in his address before the membership of the Charlotte Automotive Merchants' Association and officers of the state association, to his demand for reduction of the burden of taxes imposed by state and federal governments on the automotive trade and manufacturing industries.

In connection with the association's efforts to obtain revision downward or repeal of state taxes, Mr. Roberts said "now is the time" to begin the campaign intended to create favorable sentiment among members of the legislature. A statewide sensation was expected to result from his formal declaration of favor for the election of W. N. Everett, North Carolina, secretary of state, as governor to succeed A. W. McLean.

The North Carolina legislature was criticised by Mr. Roberts for being the only body of its kind which has imposed a license tax on automobile manufacturers. This tax is $500 per year.

The federal government has "no reason for building up a great surplus to the credit of our nation," said Mr. Roberts. He pointed out that the federal government in 1924 collected a total of $160,028,000 in various taxes. The total of all taxes paid by the automotive manufacturing and selling industries in that year was estimated at $600,000,000, including federal, state, county and city taxes.

Regarding state taxes, Mr. Roberts said motor registrations in North Carolina have increased 35 times in the ten year-period ended with 1924, while "state taxes paid by motor car owners have been increased 100 times in that period."

Drive Against Taxes Planned

SAN FRANCISCO, July 18.—In the interests of public safety, the California State Automobile Association, with headquarters in this city, is heading the campaign in the west for the removal of the special war-time excise taxes on automobiles by the next session of Congress. These taxes are a definite burden on the upkeep of motor vehicles necessary to keep them in such running condition that they can be operated with the greatest degree of safety, according to the association, which charges that owing to the taxes many owners neglect proper maintenance of their cars. The total of these taxes last year was $158,000,000, all of which came out of the pockets of the motorists, according to the report.

Canadian Automobile Output Decreases 10 Per Cent in 1924

Closed Car Production Raises Above 1923 Figure but Open Models Drop 15 Per Cent

OTTAWA, July 25.—In 1924 the eleven automobile factories in Canada produced 98,245 passenger cars, 18,043 trucks and 16,172 chassis, a total of 132,460 cars with an aggregate selling value of $88,-240,418. This was a decrease of 10 per cent from the 1923 production of 147,202 cars valued at $96,614,176, according to a statement just issued by the dominion bureau of statistics at Ottawa. With a capital investment of $60,000,000 and using raw materials costing $64,000,000, the automobile industry employed 9,270 persons during 1924 and paid over $14,-000,000 in salaries and wages.

Production of closed cars increased to 31,041 from 27,209 in 1923, but the output of open cars dropped 15 per cent to 67,-204 in the same time. Production of trucks numbered 18,043 as against 19,226 in 1923. The average selling value of motor cars remained about the same as for 1923, this figure for passenger cars being $664 and for trucks $450.

Registration of passenegr cars in Canada numbered 573,975, of trucks 55,572, and of other motor vehicles 22,574, giving a total of 652,121 registrations in 1924 as compared with 586,850 in 1923.

Although production declined 10 per cent below the 1923 totals, the average number of wage-earners for 1924 was slightly higher at 7,867. In January there were 7,775 wage-earners employed; in May, the number reached a maximum of 8,819, and then declined to 7,487 in August and to 7,080 in December. Salaried workers numbered 1,403, making a total of 9,270 employes in 1924 as compared with 9,305 in the previous year.

Canada imported 8,344 passenger cars, 957 trucks, 27,371 engines, and automobile parts worth $15,175,108, giving an aggregate import value of $28,954,700 as compared with $32,081,064 in 1923. Exports included 12,772 trucks, 43,883 passenger cars, and parts valued at $4,992,-049 to a total value of $31,501,442, decrease of 6 millions from 1923.

Chevrolet Production to Equal Last Year's Figure by August

DETROIT, July 25.—At the rate of production now being maintained by Chevrolet, the total output for 1925 up to and including August 20 will exceed that for the entire year of 1924, R. H. Grant, general sales manager has announced.

Chevrolet production for last year was 305,303. For the first six months of the present year, the output reached 246,081, or 59,222 under the total for last year. This follows the establishing of successive production records for April, May and June.

Production for June amounted to 54,944, which was exceeded by only one month, that of Octber, 1923. Sales to dealers during the past month were 54,-725, with 24,654 unfilled retail orders being in dealers' hands at the end of the month.

According to Mr. Grant, the prospects for the second half of the year are as good as those for the past six months. A review of May Chevrolet passenger car sales showed them to be 233.6 per cent better than those for May, 1924. The truck sales for the same period were 297.6 per cent better than for the corresponding month of last year.

Coming Motor Events

Automobile Shows

Boston ..... Oct. 10-17
World's Rubber and Tropical Exposition.

Dallas, Tex. ..... Oct. 10-25
Annual Automobile Show, State Fair Automobile Building, under the auspices of the Dallas Automotive Trade Association. J. W. Connell, manager.

De Pere, Wis. ..... Aug. 31-Sept. 21
Annual Automobile Show under the auspices of the Automobile Division of the Green Bay Association of Commerce.

Fresno, Cal. ..... Sept. 28-Oct. 3
Fresno Motor Car Dealers Association. Fifteenth Annual Show in connection with Fresno District Fair.

Grand Rapids, Mich. ..... Sept. 7-12
Grand Rapids Automobile Dealers Association, Seventh Annual Show in connection with West Michigan Fair, Wm. T. Morrissey, manager.

Oklahoma City, Okla. ..... Sept. 26-Oct. 3
Annual State Fair and Exposition. Passenger cars and accessories.

Sacramento, Cal. ..... Sept. 5-13
Automobile Exhibits in Diamond Jubilee State Fair.

Shreveport, La. ..... Oct. 24-Nov. 8
Twentieth Annual State Fair showing passenger cars, trucks and tractors.

New York ..... Nov. 15-21
Twenty-first Annual Automobile Salon.

Wheeling W. Va. ..... Sept. 7-12
Wheeling Automobile Dealers Association, Eleventh Annual State Fair, Exposition Building.

White River Junction, Vt. ..... Sept. 15-18
Nineteenth Annual Twin State Fair. Passenger cars, trucks and accessories. F. L. Davis, manager.

Chicago ..... Jan. 30-Feb. 6
Twenty-sixth Annual National Automobile Show and Eleventh Annual Automobile Salon.

Danbury, Conn. ..... Oct. 5-10
Eighth annual fair, Danbury Fair Auto Building, under direction of Danbury Agricultural Society, passenger cars, trucks, tractors, accessories, etc., H. Lage, manager.

Boston ..... Oct. 10-17
World's Rubber and Tropical Exposition, Mechanics Hall, Chester I. Campbell, manager.

Chicago ..... Sept. 28-Oct. 3
Fourteenth annual Safety Congress and Exhibit, Rainbow Room, Hotel Winton, under direction of National Safety Council, A. M. Smith, business manager.

Salt Lake City ..... Oct. 1-7
Third annual Automobile Show and forty-seventh annual State Fair in Coliseum Building, Wm. D. Sutton, supervisor of Automobile Show.

Foreign Shows

Berlin, Germany ..... Nov. 26-Dec. 6
Annual Automobile Show in the Kaiserdamm.

Buenos Aires, Argentina ..... Oct. 3-13
Pan-American Road Congress.

London, England ..... Oct. 8-17
Olympia Passenger Car Show.

London, England ..... Oct. 29-Nov. 7
Annual Truck Show.

Races

Altoona, Pa. ..... Sept. 7

Charlotte, N. C. ..... Oct. 24

Fresno, CaCl. ..... Sept. 30

Laurel, Md. ..... Oct. 10
A. A. A. Race, Baltimore-Washington Speedway.

Los Angeles, Cal. ..... Nov. 26

Monza, Italy ..... Sept. 6
Italian Grand Prix Race.

Syracuse, N. Y. ..... Sept. 19

Salem, N. H. ..... Oct. 12

Conventions

Buenos Aires, Argentine ..... Oct. 3-13
Pan-American Road Congress.

Cleveland ..... Sept. 14-19
Annual Convention and Exposition of American Society for Steel Treating.

Cleveland ..... Sept. 15-16
S. A. E. production meeting and exhibition.

Des Moines, Ia. ..... Nov. 12-13
Automotive Merchants' Association Convention.

Everett, Wash. ..... Aug. 3-4
Annual state convention Washington Automotive Trades Association.

Montreal, Que. ..... Oct. 7-10
Fall convention of the Motor and Accessory Manufacturers Association.

Philadelphia ..... September
S. A. E. Automotive Transportation meeting.

Pittsburgh, Pa. ..... Oct. 12-14
Pennsylvania Automotive Association Convention.

St. Louis ..... Nov. 17-19
Annual Convention of National Tire Dealers' Association.

Eaglesmere Park, Pa. ..... Sept. 14-17
General meeting of the Automotive Electric Association.

Dodge Brothers Factory Will Be Enlarged to Raise Output

Five of Eight New Buildings Already Started—Production to be 1,500 Cars Daily

DETROIT, July 25.—A program of expansion that will increase the capacity of the Dodge Brothers, Inc., factory here from 1,100 to 1,500 cars daily has been launched, President F. J. Haynes has announced. Construction has already been started on five of the eight buildings planned with construction of the other three scheduled to start immediately.

The cost of the expansion is estimated at approximately $8,000,000 and when completed will add several thousand workers to those already employed. The amount of square feet that will be allowed by the new additions will be around 750,000. It is expected that the program will be completed by January 1, 1926. The company's present intention is to go into full production as soon as possible.

A complete series of new buildings as large as many factories are being built on Lynch road. One building, 75x500 feet will house the heat treat department, another also 75x500 feet will house the heavy hammer shop, another 65x500 feet will take care of the light hammer shop. A die shop 100x312 will be erected. To supply power for these units, a large power plant equipped with the latest and most improved machinery will be built. Railway tracks are already being laid.

The largest of the additions to the main plant will be a six-story extension of plant No. 2, 100x462 feet and having a floor area of 282,000 square feet. The new forge department on Lynch road replaces a similar department in the main factory and the buildings which formerly housed it will make way for a five-story building 205x100 feet, which will be used for machining and storage purposes. What will be known as main plant No. 4, measuring 75x475 feet will join the machining and storage plant. It will also be five stories in height and will complete an L shape unit.

When Dodge Brothers first started operations in 1914, the company had only a few buildings with a total floor area of 20 acres. Today it consists of 110 acres and with the additions of the new buildings, the acreage will be brought to 130 acres, making the Dodge factory one of the largest in the world. The present buildings will be erected by the construction department of the company which has erected all the previous buildings of the factory.

World Survey of Traffic By Air Is Planned by U. S.

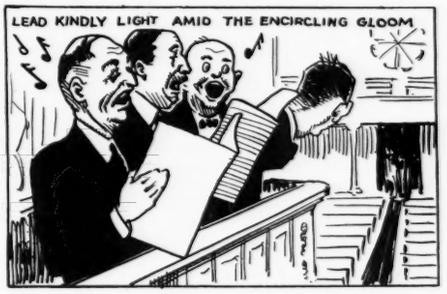
WASHINGTON, July 25.—A world economic survey of air transportation, the first to be undertaken in this or any other country, will be carried out jointly by the Department of Commerce and the American Engineering Council, it is announced by Secretary Hoover.

A committee of six, with J. Walter Drake, assistant secretary of commerce, as chairman, has been appointed to direct the work, which will be actively conducted by a field staff, of which Professor Joseph W. Roe, head of the Department of Industrial Engineering in New York University, vice chairman of the committee, is director.

The other members of the committee are: Dr. W. F. Durand, president of the American Society of Mechanical Engineers, New York; Prof. E. P. Warner, head of the aeronautical engineering course at the Massachusetts Institute of Technology; Luther K. Bell, Washington, traffic manager of the U. S. air mail and C. T. Ludington, Philadelphia, aviator.

SQUEEKS and RATTLES

THE LOST CHORD



"Church was out early last night, wasn't it?"

"Yes."

"What was the trouble?"

"Some one blew an auto horn outside and the male quartet was all that was left."

—West Virginia Moonshine.

It is said that six quarts of oil will cover a mile of sea. But have you ever let a sardine tin drop on your white flannel trousers at a picnic?

—Punch.

Why He Went Faster

"The officer is all wrong, Your Honor. I wasn't doing anything like sixty miles an hour."

"Were you watching the speedometer?"

"No, sir. I didn't need to. I wasn't in any hurry—I was just out for a spin. I wasn't going anywhere."

"Well, you're going somewhere now—Ten days."

—Huntington Motorist.

It is reported that Eddie Rickenbacker has made a fortune as a motor car manufacturer. Well, doesn't the ace always take the jack?

—Springfield Leader.

Built In Squeals

Maudie: "What's wrong with the car, it squeaks dreadfully."

Jimmie: "Can't be helped; there's pig iron in the axles."

—Columbia Jester.

Irresistible

Slick: "How do you get so many girls?"

Slicker: "Oh, I just sprinkle a little gasoline on my handkerchief."

—Punch Bowl.

Well Enough

He: "Now I want to show you how to change gears."

She: "Oh, Jack, let's not change them—they are just right as they are."

—Judge.

About his bier the mourners kneel: He was holding his cutie instead of the wheel.

—Who Bit You, 'Arry?

The fool and his money are soon parted. If only nature would arrange a similar alienation of the fool and his car.

—Associated Editors, Chicago.

Another version: Lafayette, we are hearing nothing.

—Arkansas Gazette.

A Helicopter enables you to go straight up but it doesn't sound that way.

—Arkansas Gazette.

A DEFERRED OPPORTUNITY

She: Don't you love driving on a night like this?

He: Yes, but I thought I would wait till we got farther out in the country.

—Oregon Owl.

SUSPEND CHRYSLER POLICIES

LOS ANGELES, July 25.—The California insurance department has ordered suspension of the Chrysler automobile insurance plan until an investigation reveals whether state laws have been met on the coverage.

WASHINGTON RECEIPTS UP

OLYMPIA, Wash., July 25.—Motor vehicle license receipts by the state for the year 1925 up to June 30 were not only more than $500,000 larger than for the same period last year, but are $134,072 more than for the entire year, 1924, as shown by the report just issued by W. G. Potts, state treasurer. Reports already aggregate $4,609,269.15, as against $4,176,783.56 up to June 30 last year, and $4,475,196.70 for the entire year 1924.

Prices and Weights of Current Passenger Car Models

SHIP. WT.	PASS.	BODY STYLE.	PRICE
AJAX			
2210	5-p	Touring	$865
2410	5-p	Sedan	995
ANDERSON "41"			
2650	5-p	Touring	$1,195
2675	4-p	Sp. Touring	1,445
2925	2-p	Coupe	1,425
2875	5-p	Sedan	1,695
2925	5-p	Sp. Sedan	1,895
		"50"	
2975	7-p	Touring	1,595
3200	7-p	Sedan	1,945
APPERSON "6"			
3100	5-p	Phaeton	$1,575
3130	5-p	Sp. Phaeton	1,650
3145	4-p	Coupe	2,050
3570	5-p	Sp. Sedan	2,100
3520	5-p	Brougham	2,050
		"ST 8"	
3520	5-p	Sp. Phaeton	1,995
3750	4-p	Coupe	2,450
3770	5-p	Brougham	2,450
3790	5-p	Sedan	2,595
AUBURN "4"			
------	5-p	Touring	$795
		"6-66"	
------	6-p	Roadster	1,495
2900	5-p	Brougham	1,595
2885	5-p	Sedan	1,795
		"8-88"	
------	6-p	Roadster	1,975
------	4-p	Sport Roadster	1,975
------	4-p	Club Roadster	2,075
------	5-p	Sport Brougham	2,250
------	5-p	Sedan	2,350
BUICK "Standard"			
2750	2-p	Roadster	$1,150
2920	5-p	Touring	1,175
2960	2-p	Coupe	1,375
3075	4-p	Coupe	1,565
3185	5-p	Dbl. Srv. Sedan	1,475
3245	5-p	Sedan	1,665
3050	5-p	Coach	1,295
		"Master" (120 in. W. B.)	
3285	2-p	Roadster	1,365
3465	5-p	Touring	1,395
3850	5-p	Sedan	2,225
3560	5-p	Coach	1,495
		(128 in. W. B.)	
3485	3-p	Sp. Roadster	1,750
3550	5-p	Sp. Touring	1,800
3610	7-p	Touring	1,625
3745	3-p	Country Club	2,075
3770	4-p	Coupe	2,125
3905	5-p	Brougham Sedan	2,350
4030	7-p	Limousine	2,525
3995	7-p	Sedan	2,425
3850	7-p	Town Car	2,925
CADILLAC			
		"V-63" Standard Line (132 in. W. B.)	
------	2-p	Coupe	$3,045
------	5-p	Sedan	3,195
------	7-p	Sedan	3,295
------	5-p	Brougham	2,995
------	7-p	Imperial	3,435
------	4-p	Victoria	3,095
		Custom Built (132 in.)	
------	-----	Roadster	3,250
		(138 in. W. B.)	
------	7-p	Touring	3,250
------	-----	Phaeton	3,250
4400	5-p	Coupe	4,000
4490	5-p	Sedan	4,150
4590	7-p	Suburban	4,285
4655	7-p	Imperial	4,485
CASE		**J. I. C.**	
3260	3-p	Roadster	$1,840
3290	5-p	Touring	1,885
3470	5-p	Sp. Touring	2,160
3570	4-p	Sub. Coupe	2,480
3640	5-p	Sedan	2,590
3650	5-p	Brougham	2,590
		"X"	
3020	3-p	Roadster	1,570
3050	5-p	Touring	1,595
3380	5-p	Sub. Coupe	2,290
3380	5-p	Victoria	2,290
3400	5-p	Sedan	2,385
		"Y"	
3950	7-p	Touring	2,225
4320	7-p	Sedan	2,975
CHANDLER "SS"			
3090	2-p	Roadster	$1,795
3132	4-p	Roadster	1,785
3085	5-p	Sport Touring	1,595
3223	7-p	Touring	1,735
3248	4-p	Royal Dispatch	1,885
3376	5-p	Coach	1,595
3309	5-p	Chummy Sedan	2,045
3525	5-p	Met. Sedan	2,195
3428	5-p	Sedan 4 d.	1,995
3594	7-p	Sedan	2,295
3585	7-p	Limousine	3,095

SHIP. WT.	PASS.	BODY STYLE.	PRICE
CHEVROLET			
		"Superior" (Series K)	
1755	2-p	Roadster	$525
1870	5-p	Touring	525
2015	2-p	Utility Coupe	715
2110	5-p	Coach	735
2220	5-p	Sedan	825
CHRYSLER "Four"			
		(109 in. W. B.)	
2390	5-p	Touring	$895
2440	2-p	Club Coupe	995
2590	5-p	Coach	1,045
2680	5-p	Std. Sedan	1,095
		"Six" (112¾ in. W. B.)	
2805	4-p	Roadster	$1,625
2785	5-p	Phaeton	1,395
2895	5-p	Coach	1,445
2935	4-p	Coupe	1,795
2995	5-p	Brougham	1,865
3060	5-p	Sedan	1,695
3085	5-p	Imperial Sedan	1,995
3090	5-p	Crown Sedan	2,095
		(118¾ in. W. B.)	
3225	5-p	Town Car	3,725
CLEVELAND "31"			
2325	5-p	Touring	$ 895
2580	5-p	Sedan	1,195
		"43"	
2750	5-p	Touring	1,095
2810	5-p	Touring De Luxe	1,195
2910	5-p	Sp. Touring	1,295
3000	5-p	Coach	1,295
3040	5-p	Sedan	1,495
3190	5-p	Sedan De Luxe	1,695
3190	5-p	Sport Sedan	1,725
2990	5-p	Brougham	1,545
COLE "MASTER"			
3675	4-p	Volante Touring	$2,325
3795	7-p	West. Touring	2,325
3675	4-p	Aero-Vol. Tour.	2,475
4055	5-p	Brouette Sedan	3,225
4000	7-p	Royal Sedan	3,225
4100	7-p	Royal Limousine	3,325
CUNNINGHAM			
		"V-6"	
4600	7-p	Touring	$6,650
4500	4-p	Sp. Touring	6,150
4700	4-p	Coupe	7,600
5000	6-p	Limousine	8,100
DAGMAR		**"6-70"**	
3750	4-p	Roadster	$3,500
3800	4-p	Sp. Tourer	3,500
3700	4-p	Phaeton	3,500
4200	4-p	Petite Coupe	4,500
4200	4-p	Petite Sedan	4,500
4500	4-p	De Luxe Coupe	4,750
4700	5-p	Sedan	4,700
4800	7-p	Sedan	4,750
		"6-60"	
3100	4-p	Roadster	2,185
3200	4-p	Sp. Touring	1,985
3150	5-p	Touring	1,785
3400	3-p	Coupe	2,345
3500	5-p	Sedan	2,345
DAVIS		**"90"**	
2650	4-p	M. o'War Road.	$1,495
2915	4-p	Legionaire Tour.	1,495
2750	5-p	Phaeton	1,395
------	5-p	Sedan	1,595
3070	5-p	Imperial Sedan	1,795
3065	5-p	Berline Sedan	1,795
		"91"	
2835	4-p	Roadster	1,795
3020	5-p	Phaeton	1,695
------	5-p	Sedan	1,895
3245	5-p	Imperial Sedan	2,095
3215	5-p	Berline Sedan	2,095
DIANA "St. 8"			
2970	5-p	Roadster	$1,895
------	5-p	Phaeton	1,895
3245	5-p	Std. Sedan	1,995
3245	5-p	DeLuxe Sedan	2,195
3130	5-p	Cabriolet	2,095
------	5-p	Brougham	2,095
DODGE BROTHERS			
2473	2-p	Roadster	$ 855
2593	2-p	Special Roadster	955
2567	5-p	Touring	885
2695	5-p	Spec. Touring	985
2708	2-p	Coupe "B"	995
2823	2-p	Spec. Coupe "B"	1,095
2995	5-p	"B" Sedan	1,095
3077	5-p	Spec. "B" Sedan	1,195
3020	5-p	Sedan A	1,245
3107	5-p	Spec. "A" Sedan	1,330
2723	5-p	Coach	1,095
2823	5-p	Spec. Coach	1,195
DORRIS		**"6-80"**	
4120	4-p	Pasadena Tour.	$4,150
4115	7-p	Touring	4,150
4193	4-p	Coupe	4,985
4200	5-p	Sedan	5,550
4310	7-p	Sedan	5,800

SHIP. WT.	PASS.	BODY STYLE.	PRICE
DUESENBERG			
		Straight "8"	
3920	2-p	Roadster	†
3700	4-p	Phaeton	$6,650
3920	4-p	Phaeton	†
3980	4-p	Sp. Phaeton	†
------	4-p	Sedan	†
4500	7-p	Sedan	†

†Manufacturers do not quote list prices.

DU PONT		**"D"**	
3300	2-p	Roadster	$2,600
3550	5-p	Touring	2,600
3800	7-p	Touring	2,750
3550	5-p	Touring Sedan	3,400
DURANT		**A-22**	
------	2-p	Sp. Roadster	900
2225	5-p	Touring	810
------	5-p	Spec. Touring	930
2395	4-p	Coupe	1,090
------	4-p	Spec. Coupe	1,160
2505	5-p	Sedan	1,150
------	5-p	Spec. Sedan	1,280
2430	5-p	Coach	1,050
------	5-p	Spec. Coach	1,100
ELCAR		**"4-55"**	
2560	5-p	Touring	$1,095
2779	5-p	Coach	1,195
2930	5-p	Sedan	1,395
		"6-65"	
------	5-p	Touring	1,295
2779	5-p	Coach	1,395
2900	5-p	Sedan	1,595
		"8-80"	
------	4-p	Roadster	2,315
3700	5-p	Sp. Touring	2,165
------	7-p	Touring	2,265
3000	3-p	Coupe Roadster	2,315
------	5-p	Sedan	2,265
4050	7-p	Sedan	2,765
4000	5-p	Brougham	2,865
ESSEX			
2185	5-p	Touring	$850
2370	5-p	Coach	850
FLINT		**"55"**	
3325	4-p	Sport Roadster	$1,950
3245	5-p	Touring	1,595
3310	4-p	Sp. Touring	2,050
3245	4-p	Coupe	2,195
3595	5-p	Sedan	2,285
3565	5-p	Brougham 4 d.	2,785
		"40"	
2715	5-p	Touring	1,285
2940	5-p	Sedan 4 d.	1,680
2965	5-p	Brougham	1,760
FORD			
		Without Starter and Dem. Rims	
1369	2-p	Runabout	$260
		With Balloon Tires	305
1494	5-p	Touring	290
		With Balloon Tires	335
		With Starter and Dem. Rims	
1521	2-p	Runabout	345
		With Balloon Tires	370
1644	5-p	Touring	375
		With Balloon Tires	400
1749	2-p	Coupe	520
		With Balloon Tires	545
1882	5-p	Sedan, Tudor	580
		With Balloon Tires	605
1927	5-p	Sedan, Fordor	660
		With Balloon Tires	685
FRANKLIN		**"11-A"**	
2800	3-p	Sport Roadster	$2,800
2845	5-p	Touring	2,650
2965	3-p	Coupe	2,700
3175	5-p	Sedan	3,200
3080	5-p	Sport Sedan	3,350
3275	7-p	Limousine	3,500
3135	5-p	Cabriolet	4,400
GARDNER		**"Series 5"**	
2680	5-p	Coupe	$1,275
2895	5-p	Sedan	1,475
3070	5-p	Sp. Sedan	1,595
		"6"	
3070	5-p	Touring	1,395
3200	5-p	Brougham	1,595
------	4-p	Cabriolet	1,845
3310	5-p	Sedan	1,795
3320	5-p	Sport Sedan	1,895
		"8"	
3350	5-p	Touring	1,995
------	4-p	Cabriolet	2,245
3510	5-p	Brougham	1,995
3620	5-p	Sport Sedan	2,295
3600	5-p	Sedan	2,495
GRAY		**"O"**	
1750	5-p	Touring	$630
1880	3-p	Coupe	845
2020	5-p	Sedan	895
2130	5-p	Royal Sedan	975
HAYNES		**"60"**	
3295	5-p	Touring	$1,600
3650	5-p	Brougham	2,200
3765	5-p	Sedan	2,300

SHIP. WT.	PASS.	BODY STYLE.	PRICE
HERTZ		**D-1**	
3360	5-p	Sedan	$1,695
HUDSON		**"Super Six"**	
3425	7-p	Phaeton	$1,250
3450	5-p	Coach	1,250
3425	4-p	Brougham 4 d.	1,595
3675	7-p	Sedan	1,795
HUPMOBILE "R"			
2595	2-p	Roadster	$1,225
2705	5-p	Touring	1,225
2760	2-p	Coupe	1,350
2875	5-p	Club Sedan	1,375
		"E"	
3050	2-p	Roadster	1,795
3270	4-p	Roadster	1,895
3135	5-p	Touring	1,795
3295	2-p	Coupe	2,095
3295	4-p	Coupe	2,095
3410	5-p	Sedan	2,195
JEWETT		**"23-25"**	
3025	4-p	Roadster	$1,630
2835	5-p	Touring	1,205
3015	5-p	De Luxe Touring	1,320
2835	2-p	Bus. Coupe	1,340
3025	5-p	Sedan	1,580
3305	5-p	De Luxe Sedan	1,780
3000	5-p	Coach	1,260
JORDAN			
		Series "A"	
3330	2-p	Playboy Road.	$2,575
3340	5-p	Touring	2,575
3450	3-p	Friendly "3"	2,875
3625	5-p	Brougham	2,875
3520	4-p	Victoria	2,775
3525	5-p	Sedan	2,975
3470	7-p	Sedan	3,325
3800	7-p	Suburban Sedan	3,375
KISSEL		**"55"**	
3130	2-p	Speedster	$1,895
------	2-p	Sp'dster De Luxe	2,185
------	4-p	Speedster	1,995
------	4-p	Sp'dster De Luxe	2,285
3530	2-p	Enc. Speedster	2,285
------	2-p	Enc. Sp'd'r DeL.	2,785
3190	4-p	Tourster	1,895
------	4-p	Tourster De L.	2,085
2980	5-p	Phaeton	1,685
3170	5-p	Phaeton De L.	1,885
------	7-p	Touring	1,785
------	7-p	Touring De L.	1,985
3430	4-p	Coupe	2,185
------	4-p	Coupe De Luxe	2,585
3540	5-p	Brougham Sedan	1,995
------	5-p	Broug. Sed. DeL.	2,685
------	5-p	Brougham 2 d	1,795
4070	7-p	Sedan De Luxe	3,285
4010	7-p	Berline Sed. DeL.	3,385
3530	5-p	Victoria	2,285
------	5-p	Victoria De Luxe	2,685
		"75"	
------	2-p	Speedster	2,195
------	2-p	Speedster De L.	2,485
------	4-p	Speedster	2,295
------	4-p	Speedster De L.	2,585
------	2-p	Speedster De L.	2,585
------	2-p	Enc. Sp'd'r DeL.	2,985
------	4-p	Tourster	2,195
------	4-p	Tourster De L.	2,385
------	5-p	Phaeton	1,985
------	5-p	Phaeton De Luxe	2,185
------	7-p	Touring	2,085
------	7-p	Touring De Luxe	2,285
------	4-p	Coupe	2,485
------	4-p	Coupe De Luxe	2,885
------	5-p	Sedan	2,395
------	5-p	Broug. Sed. DeL.	2,985
------	5-p	Brougham 2 d.	2,195
------	7-p	Sedan De Luxe	3,485
------	7-p	Berl. Sed. De L.	3,585
------	7-p	Victoria	2,585
------	7-p	Victoria De Luxe	2,985
LEXINGTON			
		"Concord"	
------	5-p	Touring	$1,595
------	5-p	Touring (Enc.)	1,695
------	5-p	Spec. Touring	1,795
------	5-p	Sedan	2,185
------	5-p	Spec. Sedan	2,445
		"Minute Man"	
------	2-p	Roadster	2,145
------	5-p	Touring	2,095
------	7-p	Touring	2,195
------	5-p	Lark Touring	2,345
------	5-p	Cal. Touring	2,495
------	7-p	Cal. Touring	2,495
------	5-p	Royal Coach	2,495
------	5-p	Brougham	2,595
------	5-p	Sedan	2,895
LINCOLN			
4380	2-p	Roadster	$4,000
4595	7-p	Touring	4,000
4565	4-p	Phaeton	$4,000
------	-----	Sport Touring	4,500
4655	4-p	Coupe	4,600
4775	4-p	Sedan	4,800
4825	5-p	Sedan	4,900
4865	7-p	Sedan	5,100
4945	7-p	Limousine	5,300

Prices and Weights of Current Passenger Car Models

SHIP. WT.	PASS.	BODY STYLE.	PRICE
LOCOMOBILE "48"			
5280	4-p	Sportif Tour	$ 7,460
5330	7-p	Touring	7,460
5630	5-p	Victoria Sedan	10,050
5464	7-p	Brougham	10,040
5640	7-p	Touring Lim.	9,500
5868	7-p	Enc. Drive Lim.	10,050
5600	7-p	Cabriolet	10,300
		"J-8"	
.....	2-p	Roadster	
.....	5-p	Touring	2,150
.....	5-p	Sedan	1,785
.....	5-p	Brougham	2,285
			2,285
McFARLAN "6"			
		"SV"	
3700	2-p	Roadster	$2,650
.....	2-p	Spec. Roadster	2,900
3600	5-p	Touring	2,650
.....	7-p	Touring	2,750
3850	4-p	Coupe	3,180
3850	5-p	Sedan	3,180
.....	5-p	Spec. Sedan	3,180
3850	7-p	Sedan	3,280
.....	5-p	Sub. Sedan	3,380
.....	7-p	Sub. Sedan	3,480
.....	5-p	Brougham 4 d.	3,180
		"TV"	
4000	2-p	Roadster	
4600	4-p	Sp. Touring	5,400
4900	4-p	Coupe	5,600
5200	4-p	Tour. Sedan	6,720
5200	7-p	Tour. Sedan	6,720
.....	6-p	Sedan	6,810
.....	7-p	Sedan	6,720
.....	7-p	Spec. Sedan	6,810
.....	7-p	Enc. Sedan	6,810
.....	7-p	Sub. Sedan	7,110
5200	7-p	Town Car	7,110
			9,000
MARMON "74"			
3695	2-p	Roadster	
3604	5-p	Phaeton	$3,165
3704	7-p	Touring	3,165
3604	5-p	Club Phaeton	3,165
3704	7-p	Club Touring	3,465
3799	5-p	Brougham Coupe	3.465
3729	3-p	Coupe De Luxe	3,295
3869	5-p	Sedan	3,455
3859	5-p	Sedan De Luxe	3,295
3999	7-p	Sedan	3,775
3974	7-p	Sedan De Luxe	3,370
3969	5-p	Sedan Limousine	3,850
3999	7-p	Sedan Limousine	3,900
			3,975
MERCER "6"			
3860	3-p	Runabout	$4,500
3950	6-p	Touring	4,500
3900	4-p	Sporting	4,500
4070	4-p	Coupe	6,250
4240	5-p	Sport Sedan	6,250
4350	4-p	Tour. Limousine	6,500
4300	4-p	Brougham	6,500
MOON Series "A"			
2490	5-p	Roadster	$1,395
2675	3-p	Cab. Roadster	1,695
2510	5-p	Touring	1,295
.....	5-p	Coach de Luxe	1,495
2750	5-p	DeL. Sedan 2d.	1,695
2850	5-p	Sedan 4 d.	1,595
2850	5-p	DeLuxe Sedan 4d.	1,785
		Newport	
2760	5-p	Touring	1,495
2920	5-p	Sedan	1,815
3090	5-p	Petite Sedan	1,915
		Metropolitan	
2860	5-p	Touring	1,515
3020	5-p	Sedan	1,995
3190	5-p	Sp. Sedan	2,095
		London	
3270	5-p	Sp. Touring	1,985
3590	5-p	Petite Sedan	2,540
NASH "Special"			
2870	2-p	Roadster	$1,095
2960	5-p	Touring	1,135
3120	5-p	Sedan 2d	1,265
3270	5-p	Sedan 4 d	1,545
		"Advanced" (121 in. W. B.)	
3320	3-p	Roadster	1,375
3400	5-p	Touring	1,275
3550	5-p	Sedan 2 d	1,485
		"Advanced" (127 in. W. B.)	
3480	7-p	Touring	1,525
3640	4-p	Victoria	2,090
3750	5-p	Coupe 4 d.	2,190
3830	7-p	Sedan	2,290
OAKLAND "6"			
.....	5-p	Touring	$1,025
.....	5-p	Coach	1,095
.....	3-p	Landau Coupe	1,125
.....	5-p	Sedan	1,195
.....	5-p	Landau Sedan	1,295
OLDSMOBILE "30"			
2145	2-p	Roadster	$ 890
2270	2-p	Sp. Roadster	985
2200	5-p	Touring	890

SHIP. WT.	PASS.	BODY STYLE.	PRICE
OLDSMOBILE (Cont'd)			
2360	5-p	Sp. Touring	1,015
2330	2-p	Bus. Coupe	1,045
2460	4-p	Coupe	1,175
2410	5-p	Coach	1,075
.....	5-p	De Luxe Coach	1,150
2570	5-p	Sedan	1,285
2740	5-p	De Luxe Sedan	1,375
OVERLAND "91" 4 (100 in. W. B.)			
1919	5-p	Touring	$495
.....	2-p	Coupe	635
2205	5-p	Sedan De Luxe	715
2202	5-p	Std. Sedan 2 d.	655
		"93" 6 (112¾ in. W. B.)	
2443	5-p	Sta. Sedan	895
2584	5-p	Sedan De Luxe	1,150
PACKARD "6" (126 in. W. B.)			
3643	4-p	Roadster	$2,785
3653	5-p	Touring	2,585
3595	4-p	Sp. Touring	2,750
3753	4-p	Coupe	2,585
3937	5-p	Sedan	2,585
(133 in. W. B.)			
3793	7-p	Touring	2,785
4043	7-p	Sedan	2,785
4143	7-p	Sedan Limousine	2,885
"8" (136 in. W. B.)			
4060	4-p	Runabout	3,950
4090	5-p	Touring	3,750
4023	4-p	Sp. Touring	3,900
4242	4-p	Coupe	4,650
4528	5-p	Sedan	4,750
(143 in. W. B.)			
4199	7-p	Touring	3,950
4655	7-p	Sedan	5,000
4710	7-p	Sedan Limousine	5,100
PAIGE "21-24"			
3875	4-p	Phaeton	
3935	7-p	Phaeton	$2,165
3975	5-p	Brougham	2,165
4050	5-p	Broug. De Luxe	2,195
.....	5-p	Sedan De Luxe	2,395
4325	7-p	Sedan De Luxe	2,395
			2,840
PEERLESS "6-72" (126 in. W. B.)			
3175	5-p	Touring	$1,895
3425	5-p	Coupe	2,495
3500	5-p	Sedan	2,565
(133 in. W. B.)			
3275	2-p	Roadster	
3300	7-p	Touring	2,285
3700	7-p	Sedan	1,995
3825	7-p	Limousine	2,765
		"8-67"	2,925
3950	4-p	Phaeton	
3995	7-p	Phaeton	2,945
4300	5-p	Town Brougham	2,990
4310	5-p	Town Sedan	3,895
4400	7-p	Sub. Sedan	3,895
4525	7-p	Berline Lim.	3,995
4100	4-p	Victoria Coupe	4,195
4150	5-p	Sub. Coupe	3,545
PIERCE-ARROW "33"			3,595
4350	2-p	Runabout	
4500	4-p	Touring	$5,250
4590	7-p	Touring	5,250
4730	3-p	Coupe	5,250
4800	4-p	Sedan	6,800
4960	7-p	Sedan	6,900
4750	4-p	Coupe Sedan	7,000
4730	6-p	Brougham	6,900
4850	7-p	Limousine	6,800
5060	7-p	Enclosed Lim.	7,000
4780	7-p	French Lim.	7,000
4730	6-p	Landaulet	7,000
		"80"	7,000
3205	2-p	Roadster	
3260	4-p	Phaeton	2,895
3385	7-p	Phaeton	3,095
3430	5-p	Coach	2,895
3365	4-p	Coupe Landau	3,150
3335	4-p	Coupe	3,820
3440	5-p	Sedan	3,695
3560	7-p	Sedan	3,895
3615	7-p	Enc. Drive Lim.	3,995
REO "T-6"			4,045
3350	2-p	Roadster	
3182	5-p	Sp. Touring	$1,765
3350	2-p	Coupe	1,595
3450	4-p	Coupe	1,645
3400	5-p	Sedan 4 d.	1,975
3545	5-p	Sedan 4d.	1,645
3705	5-p	Brougham 4 d.	2,085
REVERE "25"			2,235
3900	2-p	Sp. Roadster	$2,750
3975	4-p	Speedster	2,750
4050	5-p	Touring	2,750
4300	5-p	Sedan	3,800
		"M"	
3700	2-p	Roadster	3,200
3800	4-p	Sportster	3,200
3970	5-p	Touring	3,200
4400	5-p	Sedan	4,000

SHIP. WT.	PASS.	BODY STYLE.	PRICE
RICKENBACKER "Six" (117 in. W. B.)			
.....	3-p	Roadster	
.....	5-p	Phaeton	$1,595
.....	3-p	Coupe Roadster	1,495
.....	3-p	*De Luxe*	1,695
.....	4-p	Coupe De Luxe	1,820
.....	5-p	Spec. Sedan	1,995
.....	5-p	*De Luxe*	1,795
.....	7-p	Sedan De Luxe	1,920
.....	5-p	Coach Brougham	2,070
.....	5-p	*De Luxe*	1,595
"Eight" (121½ in. W. B.)			1,720
.....	3-p	Roadster	
.....	5-p	Phaeton	1,995
.....	3-p	Coupe Roadster	1,995
.....	3-p	*De Luxe*	2,095
.....	5-p	Spec. Sedan	2,220
.....	5-p	*De Luxe*	2,195
.....	7-p	Sedan De Luxe	2,320
.....	5-p	Coach Brougham	2,470
.....	5-p	*De Luxe*	1,995
			2,120
ROAMER "6-50-55" (115 in. W. B.)			
.....	2-p	Roadster	
.....	5-p	Spec. Tourer	$1,385
.....	2-p	Bus. Coupe	1,295
.....	5-p	Coupe	1,495
.....	5-p	Sedan DeLuxe	1,495
"6-54-E" (118-138 in. W. B.)			1,695
.....	4-p	Roadster	
.....	4-p	Tourer	2,385
.....	4-p	Sport	1,985
.....	7-p	Tourer	2,285
.....	3-p	Cabriolet	2,285
"4-75-E" (128 in. W. B.) "Custom Built"			2,750
.....	2-p	Speedster	
.....	3-p	Sport	3,485
.....	4-p	Tourer	3,285
"8-88" (138 in. W. B.)			2,985
.....	4-p	Roadster	
.....	5-p	Sport	2,750
.....	5-p	Tourer	2,750
.....	7-p	Tourer	2,495
.....	2-p	Speedster	2,585
.....	3-p	Cabriolet	2,985
.....	5-p	Spec. Sedan	2,950
.....	7-p	Sedan (136-in. W. B.	3,785
.....	5-p	Brougham	3,285
			2,895
ROLLIN			
2360	5-p	Touring	$1,155
2405	3-p	Coupe	1,325
2595	5-p	Brougham	1,325
2575	5-p	Sedan	1,455
ROLLS-ROYCE			
.....		Chassis	††

††Manufacturers do not quote list prices.

STANLEY "252"			
3400	5-p	Phaeton	
3800	5-p	Sedan	$2,500
STAR			3,300
1725	2-p	Roadster	
1805	5-p	Touring	$540
1860	2-p	Coupster	540
1915	2-p	Coupe	625
2090	5-p	Sedan 2 d.	715
2155	5-p	Sedan 4 d.	750
STEARNS-KNIGHT "B" (4)			820
.....	4-p	Coupe Roadster	$1,795
3775	5-p	Touring	1,595
4250	5-p	Sedan	2,095
3750	4-p	Coupe Brougham	1,895
.....	5-p	Brougham	2,095
		"S" (6)	
.....	2-p	Roadster	2,495
3775	5-p	Touring	2,395
3850	7-p	Touring	2,495
4025	2-p	Coupe	3,395
4275	4-p	Sp. Coupe	3,150
3950	5-p	Sedan	2,945
4275	7-p	Sp. Brougham	3,395
.....	4-p	Sp. Sedan	3,395
		"C" (6)	
3525	4-p	Touring	1,875
3540	5-p	Touring	1,875
3550	2-p	Sport Coupe	2,185
3650	5-p	Coupe Brougham	2,285
3700	5-p	Sedan	2,475
3700	5-p	Brougham	2,475
.....	5-p	Brough. Sedan	2,480
STERLING KNIGHT			
3200	4-p	Sp. Touring	$2,250
3235	5-p	Phaeton	2,150
3300	7-p	Touring	2,400
3200	2-p	Coupe Roadster	3,100
3450	5-p	Sedan	2,800
3550	7-p	Sedan	3,050
3450	4-p	Sp. Brougham	2,750
3300	4-p	Coupe	3,200
STEVENS-DURYEA			
4200	2-p	Roadster	
4400	7-p	Touring	$8,150
			7,500

SHIP. WT.	PASS.	BODY STYLE.	PRICE
STEVENS-DURYEA (Cont'd)			
4250	4-p	Sp. Touring	7,750
4600	4-p	Coupe	9,000
4600	4-p	Sedan	10,000
4800	6-p	Sedan	9,675
4800	6-p	Town Brough.	10,175
4800	6-p	Vestibule Limou.	9,675
4800	7-p	Vestibule Lim.	10,175
4800	7-p	¾ Limousine	10,175
4800	7-p	Cabriolet	10,175
STUDEBAKER Standard Six			
2760	3-p	Du. Roadster	$1,125
2820	3-p	Sport Roadster	1,235
2870	5-p	Du. Phaeton	1,145
2950	5-p	Sport Phaeton	1,255
2945	3-p	Country Club	1,345
2980	5-p	Coach	1,295
3175	5-p	Brougham	1,465
3260	5-p	Sedan	1,595
3280	5-p	Berline	1,654
Special Six			
3360	3-p	Du. Roadster	1,450
3480	4-p	Sp. Roadster	1,645
3475	5-p	Du. Phaeton	1,495
3605	4-p	Club Coupe	1,695
3675	4-p	Victoria	1,895
3785	5-p	Brougham	1,795
3545	5-p	Coach	1,595
3885	5-p	Sedan	2,045
3890	5-p	Berline	2,120
Big Six			
3785	7-p	Du. Phaeton	1,875
4030	5-p	Coupe	2,450
4095	5-p	Brougham 4 d.	2,575
4150	7-p	Sedan	2,575
4200	7-p	Berline	2,650
STUTZ "6-94"			
3492	2-p	Roadster	
3640	5-p	Touring	$2,395
3940	4-p	Coupe	2,395
3926	5-p	Sedan	3,050
		"6-95"	3,050
4064	5-p	Sportster	
4152	7-p	Tourster	3,035
4305	5-p	Sportbrohm.	3,070
4622	7-p	Suburban	3,785
4675	7-p	Berline	3,935
VELIE "60"			4,035
3030	4-p	Sp. Roadster	
2840	5-p	Touring	$1,650
3025	5-p	Club Phaeton	1,275
3150	4-p	Coupe	1,450
3340	5-p	Royal Sedan	1,825
3083	5-p	Coach 2 d.	1,925
3005	5-p	Coach 4 d.	1,425
WESTCOTT "44"			1,450
3150	5-p	Spec. Touring	
3300	4-p	Brougham 3 d.	$1,970
		"60"	2,320
3300	5-p	Sedan	2,325
WILLS SAINTE CLAIRE "B-68" (127 in. W. B.)			
3265	4-p	Roadster	
3335	5-p	Traveler	$2,985
3500	7-p	Phaeton	3,085
3495	4-p	Coupe	2,885
3520	5-p	Sedan	3,785
3635	7-p	Sedan	3,885
3570	5-p	Brougham 4 d.	3,900
3710	7-p	Limousine	3,900
.....	7-p	Town Car	4,085
"C-68" (Custom Built 127 in. W. B.)			5,500
3265	4-p	Roadster	
3520	5-p	Sedan	3,185
3635	7-p	Sedan	4,085
3570	5-p	Brougham	4,100
3710	7-p	Limousine	4,100
"W-6" (127 in. W. B.)			4,285
3410	4-p	Roadster	
.....	.....	Vogue Roadster	2,485
3550	5-p	Gray Goose Trav.	2,735
3500	7-p	Touring	2,485
3630	4-p	Coupe	2,385
3630	5-p	Brougham	2,985
.....	.....	Vogue Brougham	3,185
3680	5-p	Sedan	3,400
.....	.....	Vogue Sedan	3,185
3775	7-p	Sedan	3,400
.....	.....	Vogue Sedan	3,285
3835	7-p	Limousine	3,500
.....	.....	Vogue Enc. Lim.	3,385
			3,600
WILLYS-KNIGHT "65"			
2900	5-p	Touring	
2955	3-p	Coupe	$1,295
3090	5-p	Sedan	1,495
3062	5-p	Coupe Sedan	1,575
3119	5-p	Brougham	1,495
		"6"	1,695
3323	2-p	Roadster	
3395	5-p	Touring	1,845
3582	5-p	Coupe Sedan	1,845
3672	5-p	Brougham	2,145
3664	4-p	Coupe	2,295
3686	5-p	Sedan	2,345
			2,495

Mechanical Specifications of Current Passenger Car Models

This list comprises cars distributed on a national basis

MAKE AND MODEL	Wheel Base (Inches)	Tire Size Decimals-Balloons	ENGINE: Make and Model	ENGINE: Number of Cyls., Bore and Stroke	ENGINE: Rated H.P. N.A.C.C.	ENGINE: Piston Displacement	ENGINE: Valve Arrangement	ENGINE: Camshaft Drive	ENGINE: Crankcase Integ. or Sep.	ENGINE: Piston Material	ENGINE: No. Main Bear.	ENGINE: Oiling System	ENGINE: Oil Cleaner?	ENGINE: Cooling System	ENGINE: Thermostat?	ENGINE: Carburetor Make	ENGINE: Air Cleaner?	ELECTRICAL SYSTEM: Ignition System Make	ELECTRICAL SYSTEM: Generator and Starter Make	Clutch—Type and Make	Gear Set—Make	Universals—Type and Make	REAR AXLE: Type and Make	REAR AXLE: Gear Ratio	BRAKES: Foot—Type and Location	BRAKES: Hand—Type and Location	BRAKES: 4-Wheel Type =Optional	Steering Gear—Make	Rear Springs—Type and Length	Chassis Lubrication—Type and Make
Ajax	.....	30x4.75	Own.....	6-3x 4	21.6	170	L	He..	Int.	C I.	7	P K	N	Pu..	N	Car...	..	A-L..	A-L..	P-B&B..	Own....	f-The...	½ Own..	4.70	B-F.	E-T.	M	Ross..	S-50½	Pr-Al.
Anderson	41	115	31x5.25	Con....7U	6-3⅛x4¼	23.4	196	L	Ch..	Int.	C I.	4	P C.	....	Pu..	....	Zen...	N	Wes..	Wes..	P.B&B..	Dur....	f-Uni...	½ Sal...	4.75	E-R	E-T	M*	Gem..	S-58	.....
Anderson	50	122	33x4.95	Con....8R	6-3⅜x4½	27.3	242	L	He .	Sep.	C I.	4	P C.	....	Pu..	....	Zen...	N	Remy.	Remy.	P.B&B..	Dur....	f-Uni...	¾ Sal...	4.50	E-R	E-T	M*	Gem..	S-58	.....
Apperson	6	120	32x6.00	Own.....6	6-3 1/16x4¼	24.4	204	I	He..	Int.	C I.	4	P F.	N	Th..	N	Sch...	N	Remy.	Remy.	P.Roc...	Mec....	m-Stl...	½ Col...	5.10	I-F.	I-F.	M	Ross..	J-48	Pr....
Apperson	St. Away 8	130	32x6.20	Own..St. 8	8-3⅛x4½	31.3	276	L	Ch..	Sep.	C I.	5	P C.	N	Pu..	N	Sch...	N	Remy.	Remy.	P.Roc...	Mec ..	m-Ste...	½ Col..	4.63	I-F.	I-F.	M	Ross..	J-48	Pr....
Auburn	4	108	29x4.40	Lyc....CF	4-3⅝x5	21.0	206	L	Ch..	Sep.	Al..	5	P C.	....	Pu..	....	.....	N	Remy.	Remy.	.....	.....	.....	½ Own..	....	E-R	I-R.	....	.....	S	.....
Auburn	6-66	120	31x4.00	Lyc.....	6-3⅛x4½	23.4	207	L	Ch..	Int.	C I.	4	P C.	....	Pu..	....	Str....	N	Remy.	Remy.	P.B&B..	W-G....	m-Uni..	½ Col...	4.63	E-F	E-T	M	Ross..	S-56	.....
Auburn	8-88	129	32x6.20	Lyc....2H	8-3⅛x4½	31.3	276	L	Ch..	Sep.	C I.	6	P C.	....	Pu..	....	Sch...	N	Remy.	Remy.	P.Long..	W-G....	m-Uni..	½ Col...	....	B-F.	E-T	M	Ross..	S-57	.....
Barley	6-50	118	33x4	Con....7U	6-3⅛x4¼	23.4	196	L	Ch..	Int.	C I.	4	P C.	....	Pu..	....	Str....	N	Delco.	Delco.	P.B&B..	Ful.....	f-M&E..	¾ Col...	4.90	E-R	I-R.	N	Jac...	S-56	.....
Buick	Standard	114⅜	31x4.95	Own..Std.	6-3 x4½	21.6	191	I	He..	Sep.	C I.	4	P C.	N	Pu..	N	Mar...	N	Delco.	Delco.	D.Own..	Own....	m-Own..	¾ Own..	4.90	E-F.	I-R.	M	Jac...	V-48	Pr-Ze.
Buick	Master	120–128	32x5.77	Own.Mast.	6-3⅜x4¾	27.3	255	I	He..	Sep.	C I.	4	P C.	N	Pu.	N	Mar...	N	Delco.	Delco.	P.Own..	Own....	m-Own..	Fl Own..	4.70	E-F.	I-R.	M	Jac...	V-47⅝	Pr-Ze.
Cadillac	V-63	132–138	33x5†	Own..V-63	8-3⅛x5⅛	31.2	314	L	Ch..	Sep.	C I.	3	P C.	N	Pu.	Y	Own..	N	Delco.	Delco.	D.Own..	Own....	m-Spi...	Fl Own..	Opt.	B-F.	I-R.	M	Own.	N-54	Pr-Al.
Case	X	122	32x4½†	Con....8R	6-3⅜x4½	27.3	242	L	He..	Sep.	C I.	4	P C.	N	Pu.	Y	Ray...	N	Delco.	Delco.	D.Own..	Own....	f-Sne...	½ Col...	4.90	E-R	I-R.	H	Jac...	S-59½	Pr-Sa.
Case	Y	132	35x7.30	Con.....6J	6-3⅜x5	33.8	331	L	He..	Sep.	C I.	4	P C.	N	Pu.	Y	Sch...	N	Delco.	Delco.	D.Own..	Own....	f-Sne...	¾ Col...	4.45	E-F.	E-T	H	Lav...	S-57	Pr-Sa.
Case	JIC	122	32x6.20	Con....8R	6-3⅜x4½	27.3	242	L	He..	Sep.	C I.	4	P C.	N	Pu.	Y	Ray...	N	Delco.	Delco.	D.Own..	Own....	f-Sne...	½ Col...	4.90	E-F.	E-T	H	Jac...	S-55	Pr-Sa.
Chandler	SS	123	33x6.00	Own....SS	6-3½x5	29.4	289	L	Ch..	Sep.	C I.	4	P C.	N	Pu.	Y	Sch...	N	Bosch.	Bosch.	P.B&B..	Own....	f-Own...	¾ Own..	4.45	E-R	E-T	M*	Own..	S-58½	Pr-Ze.
Chevrolet	K	103	30x3½† / 29x4.40	Own..Sup.	4-3 1/16x4	21.8	171	I	He..	Int.	C I.	3	P S.	N	Pu..	N	Car...	N	Remy.	Remy.	P.Own..	Own....	m-Own..	½ Own..	3.82	E-R	I-R.	N	Own..	S-54	Pr-Al.
Chrysler	"4"	109	30x5.25 / 30x5.77	Own...25F	4-3⅝x4½	21.0	186	L	He..	Int.	Al..	3	P C.	N	Th..	N	Ste....	N	Remy.	Remy.	P. Roc..	Own....	f-Own...	½ Own..	4.60	E-R	E-T	H	Gem..	S-53	Pr-Ze.
Chrysler	6	112¾–118¾	30x5.77	Own....Six	6-3⅛x4¾	23.4	218	L	Ch..	Int.	Al..	7	P C.	F	Pu..	Y	Bal...	Ce	Remy.	Remy.	P. Own.	Own....	m-Uni...	½ Own..	4.60	E-F.	E-T	H	Gem..	S-51⅞	Pr-Ze.
Cleveland	31	108½	30x4.75	Own....31	6-2⅞x4¼	19.8	166	L	Ch..	Int.	C I.	3	P C.	N	Pu.	N	Joh...	N	Bosch.	Bosch.	P.B&B..	Own....	f-Pic...	½ Own..	4.90	E-F.	E-R	M*	CAS..	S-50	Cm-Bo
Cleveland	43	115	31x5.25	Own....43	6-3⅛x4¾	23.4	219	L	Ch..	Sep.	C I.	3	P C.	N	Pu.	N	Sch...	N	Bosch.	Bosch.	P.B&B..	Own....	f-Sne...	½ Own..	4.90	E-F.	E-R	M*	CAS..	S-53	Cm-Bo
Cole	Master	127	34x7.30	Nor....311	8-3⅛x4½	39.2	346	L	Sp..	Int.	Al..	3	P C.	....	Pu..	....	Sch...	N	Delco.	Delco.	D.Nor...	Nor.....	m-Spi...	Fl Col...	4.70	E-R	I-R.	N	Gem..	S-57	.....
Cunningham	V-6	132–142	33x6.75	Own....V8	8-3⅜x5	45.0	442	L	He.	Sep.	C I.	3	P F.	N	Pu.	Y	Str....	N	Delco.	Delco.	D.Own..	Own....	f-Sne...	Fl Tim..	4.23	I-F.	I-F.	M	Gem..	J-62	Pr-Al..
Dagmar	6-60	118	32x4½†	Con....8R	6-3⅜x4½	27.3	242	L	He..	Sep.	C I.	4	P C.	....	Pu..	....	Sch...	N	Delco.	Delco.	P.B&B..	War....	m-Spi...	½ Tim..	5.10	E-R	E-T	N	Gem..	S-52	.....
Dagmar	6-70	138	33x5†	Con.....6J	6-3⅜x5	33.8	331	L	He..	Sep.	C I.	4	P C.	....	Pu..	....	Sch...	N	Delco.	Delco.	D.B-L..	B-L....	m-Spi...	½ Tim..	4.90	E-R	I-R.	N	Gem..	S-52	.....
Davis	90	115	30x5.77	Con....7U	6-3⅛x4¼	23.4	196	L	Ch..	Int.	C I.	4	P C.	....	Pu..	....	Str....	N	Delco.	Delco.	P.B&B..	W-G....	m-Pet...	½ Col...	5.10	E-F.	E-T	H*	Rose.	S-52	.....
Davis	91	118	30x5.77	Con....8R	6-3⅜x4½	27.3	242	L	He.	Sep.	C I.	4	P C.	....	Pu..	....	Str....	N	Delco.	Delco.	P.B&B..	W-G....	m-Pet...	½ Col...	5.10	E-F.	E-T	H*	Ross.	S-52	.....
Diana	St. 8	125½	32x6.00	Cont...12Z	8-3 x4¼	23.8	240	L	Ch..	Int.	C I.	5	PK.	N	Pu..	N	Str....	N	Delco.	Delco.	P.B&B..	War....	m-Mec...	½ Sal...	4.80	E-F.	E-T	H	Ross.	S-54	Pr-Al..
Dodge Brothers	.....	116	30x5.77	Own.....	4-3⅞x4½	24.0	212	L	He.	Int.	Al..	3	P S.	....	Pu..	....	Ste....	N	N-E..	N-E..	D.Own..	Own....	m-Own..	½ Own..	4.16	E-R	I-R.	N	Own..	S-55	Pr-Ze.
Dorris	6-80	132	32x6.20	Own...6-80	6-4 x5	38.4	377	I	He.	Sep.	C I.	7	P F.	N	Pu..	N	Str....	N	Bosch.	Bosch.	D.Own..	B-L....	m-Spi...	½ Tim..	4.23	E-R	I-R.	N	Ross.	S-60	Pr-Do.
Duesenberg	St. 8	134–141	33x5	Own.....A	8-27⅛x5	26.5	260	I	Sp..	Int.	Al..	3	P K	N	Pu.	Y	Str....	N	Delco.	Delco.	P.Own..	Own....	f-Cli...	½ Own..	4.90	I-F.	E-T	H	Ross.	S-59	Pr-Do.
DuPont	D	124	32x6.20	Wis.....Y	6-3⅜x5	27.3	268	I	Ch..	Int.	C I.	3	P C.	N	Pu..	N	Sch...	N	Bosch.	Bosch.	D.Long..	Cpl.....	m-Uni...	½ Eat..	4.70 / 4.45	E-F.	E-T	H	Jac...	S-59	Pr-Al. / Pr-Ze.
Durant	A-22	109	31x5.45	Con..Spec.	4-3⅞x4¼	24.0	200	I	He..	Int.	Al..	3	P K	F	Pu.	N	Til...	N	A-L..	A-L..	P.Own..	Own....	m-Spi...	½ Ada..	4.33	E-R	I-R.	M*	War..	S-50 3/16	Pr-Al.
Elcar	4-55	116	30x5.25	Lyc....CF	4-3⅜x5	18.2	179	I	He..	Sep.	Al..	5	P C.	N	Th..	N	Zen...	N	A-L..	A-L..	P.B&B..	W-G....	m-Mec...	½ Sal...	4.70	E-R	E-T	M*	Ross.	S-51	Pr.Al
Elcar	6-65	116	30x5.25	Lyc.....5	6-3⅛x4½	23.4	207	L	Ch..	Sep.	C I.	4	P C.	N	Pu.	N	Str....	N	A-L..	A-L..	P.B&B..	W-G....	m-Mec...	½ Sal...	4.70	E-F	E-R	M	Ross.	S-51	Pr-Al.
Elcar	8-80	127	32x6.20	Lyc.....H	8-3⅛x4¼	21.3	261	L	Ch..	Sep.	C I.	5	P C.	N	Pu.	N	Sch...	N	Delco.	Delco.	P.B&B..	W-G....	m-Spi...	¾ Sal...	4.71	E-F.	E-T	H	Ross.	S-58	Pr-Al..
Essex	6	110½	30x4.95	Own.....6	6-2 11/16x4¼	17.3	145	L	Ch..	Int.	Al..	3	Sp..	N	Th..	N	Ste....	N	Bosch.	Bosch.	P.Own..	Own....	m-Spi...	½ Own..	5.60	E-R	I-R.	N	Own..	S-54	Ow ..
Flint	40	115	30x5.77	Con....6W	6-3⅛x4¼	23.4	196	L	Ch..	Int.	C I.	4	P C.	....	Pu..	....	Car...	N	A-L..	A-L..	P.Own..	War....	m-Spi...	¾ Ada..	4.77	I-F..	E-T	M	Ross.	S-50	Pr-Ze.
Flint	55	120	32x6.20	Con....6F	6-3⅜x5	27.3	268	L	Ch..	Int.	C I.	7	P C.	....	Pu.	Y	Str....	N	DeJo.	DeJo.	P.Own..	War....	m-Spi...	¾ Ada..	4.77	I-P..	I-R.	H	Ross.	S-55	Pr-Ze.
Ford	T	100	30x3½†	Own.....T	4-3 3/16x4	22.5	177	L	He..	Int.	C I.	3	Sp..	N	Th..	N	Own..	N	Own..	Own..	D.Own..	Own....	m-Own..	½ Own..	3.63	E-T	I-R.	N	Own.	O-43½	Cu....
Franklin	11A	119	31x5.25	Own...11A	6-3 1/16x4	25.4	199	I	Ch..	Sep.	Al..	7	P C.	N	A...	N	Str....	Ce	Dyn..	Dyn..	P.B-L...	Own....	m-Spi...	½ Own..	4.73	E-T	E-R	N	Own.	E-38	Pr-Ze.
Gardner	Series 5	112	32x4†	Lyc....CE	4-3 11/16x5	21.7	214	L	He..	Sep.	Al..	5	P C.	....	Th..	....	Zen...	N	Wes..	Wes..	P.B&B..	Mec....	m-Pet...	¾ Fli...	4.80	E-R	E-T	N	Dit...	S-51¼	Pr-Al.
Gardner	6A	117	31x5.25	Lyc.....2S	6-3⅛x4½	23.4	207	L	Ch..	Sep.	C I.	4	P C.	....	Pu..	....	Sch...	N	Remy.	Remy.	D.B&B..	Mec....	m-Pet...	½ Col...	4.90	I-F.	E-T	M	Gem..	S-58	Pr-Al.
Gardner	8A	125	30x5.77	Lyc....2H	8-3⅛x4½	31.2	276	L	Ch..	Sep.	C I.	5	P C.	....	Pu..	....	Sch...	N	Remy.	Remy.	P.B&B..	Mec....	m-Pet...	½ Col...	4.63	I-F.	E-T	M	Gem..	S-57	Pr-Al.
Gray	O	104	30x3½†	Own.....R	4-3⅝x4	21.0	165	L	He..	Int.	C I.	3	Sp..	N	Th..	N	Scoe..	N	A-L..	A-L..	P.Own..	Det.....	f-Sne...	½Tim...	3.90	I-R.	E-T	N	Own..	Q-30	Oc....
Haynes	60	121	33x5.77	Own....60	6-3⅛x4¾	29.4	271	L	He.	Sep.	C I.	3	P S.	N	Pu.	N	Ray...	N	Kin...	L-N...	D.War..	Mec....	m-Uni...	¾ Own..	4.41	E-R	E-T	N	Jac...	S-54¼	Pr-Do.
Hertz	D-1	114	31x4†	Con...10U	6-3⅛x4¼	23.4	196	L	Ch..	Int.	C I.	4	P S.	N	Pu.	N	Zen...	N	Delco.	Delco.	D.Long..	Det.....	m-Spi...	½ Tim..	4.89	E-R	E-T	O*	Ross.	S-56	Pr-Al.
Hudson	Super 6	127⅜	33x6.00	Own.....6	6-3½x5	29.4	289	L	Ch..	Sep.	Al..	4	Sp..	N	Pu.	N	Ste....	N	Bosch.	Bosch.	D.Own..	Own....	m-Spi...	½ Own..	4.45	E-R	I-R.	N	Gem..	S-57½	Ow....
Hupmobile	Series R	115	31x5.25	Own.....R	4-3⅛x5½	16.9	183	L	Ch..	Int.	C I.	3	P C.	....	Th..	Y	Str....	N	Wes..	Wes..	P.Long..	Own....	m-Uni...	½ Own..	4.90	E-R	I-R.	N	Ross.	S-56½	Pr-Al.
Hupmobile	E	118¼	33x6.00	Own.....E	8-27⅛x4¾	26.4	247	L	Ch..	Sep.	C I.	5	P C.	....	Pu.	Y	Str....	N	A-K..	Wes..	P.Long..	Det.....	m-Uni...	½ Own..	4.64	E-F	E-T	H	Ross.	S-56½	Pr-Al. / Pr-Ze.
Jewett	23-25	112	31x5.25	Own..23-25	6-3⅛x5	25.4	249	L	Ch..	Int.	C I.	3	P C.	N	Pu.	....	Str....	N	A-K..	Remy.	P.Long..	W-G....	m-Mec...	½ Sal...	4.45	E-R	E-T	H*	Gem..	S-54	Pr-Al.
Jordan	Series A	125½	32x6.20	Con..Spec.	8-3 x4¾	28.8	268	L	Ch..	Sep.	C I.	5	P C.	N	Pu..	Y	Str....	Ce	Bosch.	Bosch.	P.Det...	Det.....	m-Thi...	½ Tim..	4.64	E-F.	E-T	H	Gem..	S-55¾	Pr-Al.
Kissel	55	121	32x6.20	Own....55	6-3 1/16x5⅛	26.3	265	L	Ch..	Int.	C I.	3	P S.	....	Pu..	....	Str....	N	Remy.	Remy.	P.B&B..	W-G....	m-Spi...	¾ Tim..	4.45	E-R	E-T	H*	Jac...	S-53	.....
Kissel	75	126–137	33x6.00	Own....75	8-3 3/16x4½	32.5	287	L	Ch..	Int.	Al..	5	P S.	....	Pu..	....	Sch...	Ce	Remy.	Remy.	P.B&B..	W-G....	m-Spi...	½ Tim..	4.41	E-F.	E-T	H	Ross.	S-56	.....
Lexington	Concord	119	31x5.25	Ans.....M	6-3 1/16x4½	26.3	233	I	Ch..	Int.	C I.	3	P F.	N	Pu..	....	Ray...	N	Conn..	Bosch.	D.Long..	W-G....	f-Pick...	½ Sal...	4.70	E-R	E-T	H*	Ross.	S-56	Pr-Do
Lexington	Minute Man	123	32x6.20	Ans.....F	6-3 1/16x5¼	26.3	272	I	Ch..	Int.	Al..	3	P F.	N	Pu.	Y	Ray...	N	Conn..	Bosch.	D.Long..	W-G....	f-Pick...	¾ Sal...	5.10	E-R	E-T	H*	Ross.	S-59	Pr-Do
Lincoln	8	136	33x5†	Own.....8	8-3⅜x5	36.5	358	L	Ch..	Sep.	Al..	5	P C.	N	Pu.	Y	Str....	N	Deleo.	Delco.	D.Own..	Own....	m-Spi...	Fl Tim..	4.58	E-R	I-R.	N	Own..	S-60	Pr-Al.

KEY TO SYMBOLS

*—At extra cost
†—Balloons at extra cost
½—Semi-floating
¾—Three-quarter floating
A—Air
Al—Aluminum
B—Semi-steel
B-F—Both internal and external, four wheels
Ce—Centrifugal
Cb—Cobb
Cl—Cast iron
Cm—Central magazine
Cu—Oil and grease cups
D—Multiple disk
E—Full elliptic
E-F—External four wheels
E-R—External rear wheels
E-T—External transmission
f—Fabric
F—Filter
Fl—Full floating
G—Head and side
Gr—Grease cups
H—Horizontal (valves)
H—Hydraulic (brakes)
He—Helical gear
I—In head
In—Inertia
Int—Integral
I-F—Internal four wheels
I-R—Internal rear wheels
J—Three-quarter elliptic
K—Cone
L—L head
m—Metal
M—Mechanical
N—None (oil cleaner)
N—Platform (rear springs)
O—Optional (brakes)
O—Special type (rear springs)
Oc—Oil cups
Ow—Oil cups with wick feed
P—Single plate
Pr—Pressure gun
PC—Pressure to all crankshaft and connecting rod bearings
PF—Full pressure to all bearings
PK—Pressure to crankshaft, connecting rods and camshaft bearings
PS—Splash with pressure
Pu—Pump
Q—Quarter elliptic
R—Rectifier
S—Semi-elliptic
Sem—Semi-ells
Sp—Splash (lubrication)
Sp—Spur gear (camshaft drive)
Spe—Special make
St—Strainer
Stn—Standard
T—T head
Th—Thermo-syphon
V—Cantilever
Wat—Watford
X—Sleeve valve
Ze—Zerk
Zen—Zenith

ABBREVIATIONS—NAMES OF MFRS. OF STOCK PARTS

A-K—Atwater Kent
A-L—Auto-Lite
Ada—Adams
Al—Alemite
Ans—Ansted
B&B—Borg & Beck
B-L—Brown-Lipe
Bal—Ball & Ball
Bas—Bassic cups
Bij—Bijur
Bo—Bowen Products
Car—Carter
CAS—CAS Products
Cle—Cleveland
Cli—Climax
Con—Continental
Conn—Connecticut
Col—Columbia
Cpl—Campbell
DeJo—DeJon
Det—Detroit
Dit—Ditweiler
Do—Dot
Due—Duesenberg
Dur—Durston
Dyn—Dyneto
Eat—Eaton
Fli—Flint
Ful—Fuller
Gem—Gemmer
Hoo—Hoosier
Jac—Jacox
Joh—Johnson
Kin—Kingston
L-N—Leece-Neville
Lav—Lavine
Lyc—Lycoming
M&E—Merchant & Evans
Mar—Marvel
Mec—Mechanics Machine Co.
Mon—Monson
Mun—Muncie
N-E—North East
Nor—Northway
Pet—Peters
Ray—Rayfield
Roc—Rockford
Sa—Saal
Sal—Salisbury
Sch—Schebler
Sne—Snead
Spe—Special Make
Spi—Spicer
Spl—Splitdorf
Ste—Stewart
Stl—Sterling
Str—Stromberg
The—Thermoid
Thi—Thiemer
Til—Tillotson
Tim—Timken
Uni—Universal
W-G—Warner Gear
Wag—Wagner
War—Warner
Wes—Westinghouse
Wis—Wisconsin

LH

Must Your Dealers Defend Your Braking Equipment?

—A Message to Manufacturers of Cars Equipped with Mechanical Two-Wheel and Four-Wheel Brakes—

If your dealers have to defend your car's brakes, then your car is already suffering from the competition which Lockheed Hydraulic Four-Wheel Brakes have introduced into automobile merchandising.

You will undoubtedly find that the defense by your dealers and their salesmen grows weaker with each succeeding day. More and more, it lacks real conviction. They, themselves, are beginning to doubt.

For prospects, in ever increasing numbers, are demanding hydraulic four-wheel brakes—Lockheeds. In more and more sales, they have become the deciding factor.

You and your dealers are struggling against a fundamental improvement in the principle of motor car braking which is winning its way everywhere and which is destined to become universal because it is unquestionably right and better.

In this battle for business—as in military battle—the best way to meet superior offensive equipment is to adopt that equipment yourself.

By doing that, you will obtain another distinct advantage. You will be in a position to interest the owners of hundreds of thousands of hydraulic brake equipped cars who, when in the market for a new car, will consider only those cars with hydraulic brakes.

HYDRAULIC BRAKE COMPANY
5835 Russell Street Detroit, Michigan

The Answer

LOCKHEED HYDRAULIC
Four Wheel Brakes

Mechanical Specifications of Current Passenger Car Models—Continued

(This list comprises cars distributed on a national basis)

MAKE AND MODEL	Wheel Base (Inches)	Tire Size Decimals-Balloons	ENGINE: Make and Model	Number of Cyls., Bore and Stroke	Rated H.P. N.A.C.C.	Piston Displacement	Valve Arrangement	Camshaft Drive	Crankcase Integ. or Sep.	Piston Material	No. Main Bear.	Oiling System	Oil Cleaner?	Cooling System	Thermostat?	Carburetor Make	Air Cleaner?	ELECTRICAL SYSTEM: Ignition System make	Generator and Starter Make	Clutch—Type and Make	Gear Set—Make	Universals—Type and Make	REAR AXLE: Type and Make	Gear Ratio	BRAKES: Foot—Type and Location	Hand—Type and Location	4 Wheel Type (*=Optional)	Steering Gear—Make	Rear Springs—Type and Length	Chassis Lubrication—Type and Make
Locomobile.....Jr. 8	124	30x5.70	Own.....8	8-2 11/16x4	25.3	206	I	Ch..	Int.	C I.	5	P F.	F	Pu..	N	Str....	N	DeJo..	DeJo..	P.Spi...	Own....	m-Spi...	½ Own	4.77 5.11	E-F.	E-R	M	Ross..	S-5 1/2..	Pr-Ze.
Locomobile.....48	142	35x6.75	Own....48	6-4 1/2x5 1/2	48.6	525	T	He..	Sep.	C I.	7	P F.	F	Pu..	Y	Bal...	N	Delco.	Wes...	D.Own..	Own....	m-Spi...	Fl Own..	3.5	B-F.	I-R.	M	Own..	J-50....	Pr-Ze.
Marmon.....74	136	32x6.20	Own....74	6-3 3/4x5 1/8	33.8	340	I	He..	Sep.	Al. C I	3	P F.	....	Pu..	N	Str....	N	Delco.	Delco.	D.Own..	Own....	m-Spi...	3/4 Own..	4.10	E-R	I-R.	M*	Own..	O-45....	Pr-Al.
McFarlan.....SV	127	32x6.20	Wis.....Y	6-3 3/8x5	27.3	268	L	Ch..	Int.	C I.	3	P F.	F	Pu..	N	Ray...	N	Wes...	Wes...	D.Long..	W-G....	m-Uni...	½ Tim..	4.90	E-F.	E-T	H	Ross	S-58 1/2..	Pr...
McFarlan.....TV	140	34x7.20	Own...TV	6-4 1/2x6	48.6	573	T	He..	Sep.	Al..	4	P F.	F	Pu..	N	Ray...	N	Wes...	Wes...	D M&E.	B-L....	f-Sne...	Fl Tim..	3.53	E-F.	I-R.	H	Ross.	S-64....	OW..
Mercer.....6	117-132	32x4 1/2†	Own.....6	6-3 3/4x5	33.8	331	I	He..	Sep.	Al..	3	P C.	N	Pu..	N	Str....	N	Spl...	Bosch.	D.B-L..	B-L....	m-Uni...	3/4 Col...	4.08	I-F.	E-T	M	Gem.	S-59....	Pr...
Moon.....Newport	115	31x5.25	Con....7U	6-3 1/8x4 1/4	23.4	196	L	Ch..	Int.	C I.	4	P C.	N	Pu..	N	Str....	N	Delco.	Delco.	D.B&B..	W-G....	m-Spi...	½ Tim..	5.10	E-F.	E-T	H	Ross.	S-54....	CuBas
Moon.....Metropolitan	118	31x5.25	Con....7C	6-3 1/4x4 1/2	25.4	224	L	He..	Sep.	C I.	4	P C.	N	Pu..	N	Str....	N	Delco.	Delco.	P.B&B..	W-G....	m-Spi...	½ Tim..	5.10	E-F.	E-T	H	Ross.	S-54....	CuBas
Moon.....London	128	32x6.20	Con....8R	6-3 3/8x4 1/2	27.3	242	L	He..	Sep.	C I.	4	P C.	N	Pu..	N	Str....	N	Delco.	Delco.	P.B&B..	B-L....	m-Spi...	½ Tim..	5.09	E-F.	I-R.	H	Ross.	S-54 7/8..	CuBas
Moon.....Series A	113	30x5.25	Con....7Z	6-3 1/8x4 1/4	23.4	196	L	Ch..	Int.	C I.	4	P C.	N	Pu..	N	Str....	N	Delco.	Delco.	P.B&B..	W-G....	m-Spi...	½ Sal..	4.80	E-F.	E-T	H	Ross.	S-54....	Pr-Al.
Nash.....Advanced	121-127	33x6.00	Own...161	6-3 1/4x5	25.4	249	I	He..	Int.	C I.	3	P C.	N	Pu..	N	Mar...	N	Delco.	Delco.	P.B&B..	Own....	m-Own..	½ Own..	4.50	B-F.	E-T	M	Gem.	S-53 1/2..	Pr-Al.
Nash.....Special	112 1/2	31x5.25	Own...131	6-3 1/8x4 1/2	23.4	207	I	He..	Int.	C I.	3	P C.	N	Pu..	N	Mar...	N	Delco.	Delco.	P.B&B..	Own....	m-Own..	½ Own..	4.88	B-F.	E-T	M	Gem.	S-53 7/8..	Pr-Al.
Oakland.....“6”	113	30x5.25	Own...6-54	6-2 7/8x4 3/4	19.8	185	L	Ch..	Sep.	B..	3	P K	F	Pu..	N	Str....	F	Remy.	Remy.	P. Hoo..	Mun....	m-Mec..	½ Own..	4.75	E-F.	E-T	M	Jac..	S-52 1/2..	Pr....
Oldsmobile.....30	110 1/2	31x4.95	Own.....30	6-2 3/4x4 3/4	18.2	169	L	He..	Int.	C I	3	P C.	N	Pu..	N	Zen...	N	Delco.	Delco.	P.B&B..	Mun....	f-The...	½ Own..	5.19	E-R	E-T	N	Jac..	S-50 3/4..	Pr....
Overland.....91	100	30x3 1/2	Own.....91	4-3 1/2x4	19.6	154	L	He..	Int.	C I.	3	Sp..	N	Th..	N	Til....	N	A-L...	A-L...	P.B&B..	Own....	m-Own..	½ Own..	4.50	E-R	I-R.	N	Own.	O-25....	Cu....
Overland.....93	112 3/4	30x4.95	Own.....93	6-3 x4	21.6	170	L	He..	Int.	Al..	3	P C.	N	Th..	N	Til....	N	A-L...	A-L...	D.Own..	Own....	m-Own..	½ Own..	5.11	E-R	E-T	N	Own..	S-52 1/2..	Pr....
Packard.....6	126-133	33x5.77	Own.....6	6-3 1/2x5	29.4	289	L	Ch..	Sep.	C I.	7	P F.	R	Pu..	Y	Own..	N	Delco.	Dyn..	D.Own..	Own....	m-Mec..	½ Own.	4.66 5.10	B-F.	I-R.	M	Own..	S-56....	CmBij
Packard.....8	136-143	33x6.75	Own.....8	8-3 3/4x5	36.5	358	L	Ch..	Sep.	C I.	9	P F.	R	Pu..	Y	Own..	N	Delco.	Dyn..	D.Own..	Own....	m-Mec..	½ Own..	4.66	B-F.	I-R.	M	Own..	S-56....	CmBij
Paige.....21-25	131	33x6.75	Con...10A	6-3 3/4x5	33.8	331	L	Ch..	Sep.	C I.	4	P C.	N	Pu..	Y	Joh...	N	A-K..	Remy.	D.Long..	W-G....	m-Mec..	½ Sal..	4.90	E-R	E-T	H	Gem..	S-61 1/2..	Pr-Al.
Peerless.....6-72	126-133	33x6.00	Own....72	6-3 1/2x5	29.4	289	L	Ch..	Sep.	C I.	7	P C.	N	Pu..	N	Joh....	....	Delco.	Delco.	D.Own..	Own....	m-Spi...	3/4 Tim..	4.90	E-F.	I-R.	H	Gem..	S-54....	Pr-Al.
Peerless.....67	128	33x6.75	Own....67	8-3 1/4x5	33.8	332	L	He..	Sep.	C I.	7	P C.	N	Pu..	N	Str....	N	Delco.	Delco.	D.Own..	Own....	m-Spi...	3/4 Tim..	4.90	E-F.	I-R.	H	Gem..	S-56....	Pr-Al.
Pierce Arrow.....33	138	33x5	Own.....33	6-4 x5 1/2	38.4	415	T	He..	Sep.	C I.	7	P F.	N	Pu..	Y	Own..	N	Delco.	Delco.	D.Own..	Own....	m-Spi...	½ Own..	4.20	E-R	I-R.	M*	Gem.	S-61 1/4..	Pr-Ze.
Pierce Arrow.....80	130	32x5.77	Own.....80	6-3 1/2x5	29.4	289	L	Ch..	Sep.	C I.	7	P F.	N	Pu..	Y	Own..	N	Delco.	Delco.	P.B&B..	B-L....	m-Spi...	½ Tim..	4.45	I-F.	I-R.	M	Gem.	S-56 1/2..	Pr-Ze
Reo.....T6	120	32x6.20	Own....T6	6-3 3/16x5	24.3	239	G	He..	Int.	Al..	4	P S.	N	Pu..	N	Sch...	N	N-E..	N-E..	D.Own	Own....	m-Own. f-Own.	½ Own..	4.70	E-R	I-R.	N	Own.	S-54 1/2.. S-55 1/2..	Pr-Ze.
Revere.....M	131	32x4 1/2†	Mon....M	4-4 3/4x6	30.6	361	H	Ch..	Int.	Al..	2	P C.	....	Pu..	N	Str....	....	Bosch.	Wes...	D.B-L..	B-L....	m-Spi...	½ Spe..	3.44	I-R.	E-R	....	Gem..	S-56 1/2..	Pr-Al.
Revere.....25	131	32x6.20	Con.....6J	6-3 3/4x5	33.8	331	L	He..	Sep.	C I.	4	P C.	N	Pu..	N	Sch...	In	Bosch.	Bosch.	D.Ful...	Ful....	m-Spi...	3/4 Col...	3.75	I-F.	E-T	M	Gem.	S-56 1/2..	Pr-Al.
Rickenbacker.....D	117	31x5.25	Own....D	6-3 1/4x4 3/4	25.3	236	L	Ch..	Int.	C I.	7	P C.	R	Pu..	N	Str....	In	Bosch.	Bosch.	D.Own.	Long....	m-Mec..	½ Col...	4.70	I-F.	E-T	M	Gem.	S-57....	Pr-Al.
Rickenbacker.....B-8	121 1/2	33x6.00	Own..B-8	8-3 1/4x4 3/4	38.7	315	L	Ch..	Int.	C I.	9	P C.	R	Pu..	N	Zen...	In	Delco.	Bosch.	D.Own.	Long....	m-Mec..	½ Own..	4.70	I-F.	E-T	M	Gem.	S-59....	Pr-Al.
Roamer.....6-54-E	118-138	32x4 1/2	Con.12XD	6-3 1/2x5 1/4	29.4	303	L	He..	....	Al..	3	P S.	....	Pu..	....	Str....	N	A-L...	Wes...	P.B&B..	Ful....	f-M&E..	3/4 Tim..	4.45	E-R	I-R.	M*	Jac..	V-55 3/4..	.....
Roamer.....4-75-E	128	32x4 1/2	Due....G1	4-4 1/4x6	28.9	340	H	Ch..	....	Al..	3	P F.	....	Pu..	....	Str....	....	A-L...	Wes...	D.B-L..	B-L....	f-M&E..	3/4 Tim..	4.63	E-R	I-R.	M*	Jac..	V-55 3/4..	.....
Roamer.....6-50-55	115	31x5.25	Con....7U	6-3 1/4x4 1/4	23.4	196	L	Ch..	....	C I.	5	P C.	....	Pu..	....	Sch....	....	A-L...	A-L...	P.B&B..	Dur....	f-Uni...	½ Sal..	4.64	E-F.	E-T	H	Ross.	S-52....	.....
Roamer.....8-88	138	32x6.20	Lyc....3H	8-3 3/8x4 1/2	32.5	257	L	Ch..	....	C I.	5	P F.	....	Pu..	....	Sch....	....	A-L...	A-L...	P.B&B..	Cpl....	f-Uni...	3/4 Sal..	4.08	E-F.	E-T	H	Ross.	V-55 3/4..	.....
Rollin.....G2	112	31x5.25	Own.....G	4-3 1/4x4 1/2	16.9	149	L	He..	Int.	Al..	4	P C.	N	Th..	N	Til....	N	Conn..	Dyn..	P.B&B..	Mun....	f-Own..	½ Sal..	5.10	I-F.	I-F.	M	Ross.	O-46....	Pr-Ze.
Rolls Royce...Silver Ghost	143 1/2	33x5†	Own.....	6-4 1/4x4 3/4	48.6	453	L	He..	Sep.	Al..	7	P F.	F	Pu..	N	Own..	N	Bosch.	Wes...	K.Own..	Own....	m-Own..	Fl Own..	3.72	I-R.	I-R.	N	Own.	V-54 1/2..	Pr-Al.
Rolls Royce....“Phantom”	143 1/2-150 1/2	33x5	Own.....	6-4 1/4x5 1/2	48.3	468	I	He..	Sep.	Al..	7	P F.	F	Pu..	N	Own..	....	Wat..	Own..	P.Own..	Own....	m-Own..	Fl.Own....	....	I-F.	E-R	M	Own.	V-54 1/2..	Pr-En.
Stanley.....252	122	32x5.77	Own...252	2-4 x5	20.0	126	....	....	....	C I.	2	Sp..	....	....	....	None....	....	None..	Bosch.	None....	None....	f-The...	½ Own..	4.50	E-F.	I-R.	H	Ross.	S-58....	Pr....
Star.....4	102	30x3 1/2†	Con..Spec.	4-3 3/8x4 1/4	18.2	161	L	Ch..	....	Al..	3	P K	N	Pu..	N	Til....	N	A-L...	A-L...	P.Own..	War....	m-Spi...	½ Ada..	4.87	E-R	I-R.	M*	War.	S-49 1/2..	Pr-Al
Stearns Knight.....B	119	33x4 1/2†	Own...Kni	4-3 3/4x5 5/8	22.5	249	X	Ch..	Sep.	C I.	3	P C.	....	Pu..	....	Sch....	N	A-K..	A-L...	D.Own..	Own....	f-Cli...	½ Own..	4.50	E-R	I-R.	H*	Own.	V-50....	Pr-Al.
Stearns Knight.....C	121	33x6.00	Own...Kni	6-3 1/4x5	25.4	249	X	Ch..	Sep.	Al..	4	P C.	N	Pu..	N	Joh....	N	DeJo..	DeJo..	D.M&E..	Own....	f-Cli...	½ Eat..	5.30	E-R	I-R.	H*	Ross.	V-50....	Pr-Al.
Stearns Knight.....S	130	33x6.60	Own...Kni	6-3 1/2x5	29.4	289	X	Ch..	....	Al..	4	P C.	N	Pu..	N	Joh....	N	DeJo..	DeJo..	D.M&E..	Own....	f-Cli...	½ Own..	4.50	E-R	I-R.	H*	Sta...	S-50....	Pr-Al.
Sterling Knight.....	125	32x4 1/2†	Own....B6	6-3 1/4x4 5/8	25.4	232	X	Ch..	Sep.	C I.	7	P F.	....	Th..	....	Str....	N	DeJo..	DeJo..	D-Det..	Det....	f-Cli...	½ Tim..	5.10	E-R	I-R.	H*	Ross.	S-58....	Pr-Al.
Stevens Duryea.....G	138	33x5†	Own.....G	6-4 7/16x5 1/2	47.3	511	L	He..	Sep.	C I.	4	P S.	N	Pu..	Y	Str....	N	Bosch.	Bosch.	D.B-L..	B-L....	m-Spi...	Fl Tim..	3.76	E-R	I-R.	N	Ross.	J-50 1/2..	Pr-Do.
Studebaker.....Sta. 6	113	31x5.25	Own...ER	6-3 3/8x4 1/2	27.3	242	L	Ch..	Int.	C I.	4	P K	N	Pu..	N	Str....	N	Wag.. Remy	Wag.. Remy	P.Own..	Own....	f-The...	½ Own..	4.18	E-R	E-T	H*	Own.	S-50 3/8..	Pr-Al.
Studebaker.....Spec. 6	120	32x6.20	Own...EQ	6-3 1/2x5	29.4	289	L	He..	Sep.	C I.	4	P K	N	Pu..	N	Str...	N	Wag.. Remy	Wag.. Remy	P.Own..	Own....	m-Spi...	½ Own..	4.36	E-R	E-T	H*	Own.	S-56....	Pr-Al.
Studebaker.....Big 6	127	34x7.30	Own...EP	6-3 7/8x5	36.0	353	L	He..	Sep.	C I.	4	P K	N	Pu..	N	Bal...	N	Wag.. Remy	Wag.. Remy	P.Own..	Own....	m-Spi...	½ Own.	3.69	E-R	E-T	H*	Own.	S-56....	Pr-Al.
Stutz.....6-94	120	32x6.20	Own...691	6-3 1/2x5	29.4	289	I	Ch..	Int.	B	3	P C.	N	Pu..	N	Str....	N	Remy.	Remy.	P.B&B..	W-G....	m-Mec..	3/4 Tim..	4.62	E-F.	E-T	H	Gem.	S-62....	Pr-Al.
Stutz.....6-95	130	33x6.75	Own...691	6-3 1/2x5	29.4	289	I	Ch..	Int.	B	3	P C.	N	Pu..	N	Str....	N	Remy.	Remy.	P.B&B..	W-G....	m-Mec..	3/4 Tim..	4.90	E-F.	I-R.	H	Gem.	S-62....	Pr-Al.
Velie.....60	118	31x5.25	Own.....59	6-3 3/8x4 1/4	24.4	203	I	He..	Int.	C I.	4	P F.	N	Th..	N	Str....	N	Remy.	Remy.	P.B&B..	Mun....	m-Uni...	½ Own..	5.10	E-F.	E-T	H	Ross.	S-55....	Pr-Do.
Westcott.....44	120	32x6.20	Con....8R	6-3 3/8x4 1/2	27.3	242	L	He..	Sep.	C I.	4	P C.	....	Pu..	....	Str....	N	Delco.	Delco.	P.B&B..	W-G....	m-Cle...	½ Col...	4.90	E-R	E-T	H*	Gem.	S-57 1/2..	.....
Westcott.....60	118	32x6.20	Con....8R	6-3 3/8x4 1/2	27.3	242	L	He..	Sep.	C I.	4	P C.	....	Pu..	....	Str....	N	Delco.	Delco.	P.B&B..	W-G....	m-Cle...	½ Col...	4.63	E-R	E-T	H*	Gem.	S-56....	.....
Wills Ste. Claire.....W6	127	33x6.00	Own...W6	6-3 1/4x5 1/2	25.4	274	I	He..	Int.	C I.	7	P F.	N	Pu..	Y	Sch....	N	Delco.	Delco.	P.Own..	Own....	m-Spi...	½ Tim..	4.45	E-F.	E-T	H	Own.	S-58....	Pr-Al.
Wills Ste. Claire...B&C6	127	32x6.20	Own.BC68	8-3 1/4x4	33.8	265	I	He..	Sep.	C I.	3	P F.	N	Th..	N	Sch....	N	Delco.	Delco.	P.Own..	Own....	m-Spi...	½ Tim..	4.45	E-F.	E-T	H	Own.	S-58....	Pr-Al.
Willys Knight.....65	118	30x5.77	Own.....65	4-3 5/8x4 1/2	21.0	186	X	Ch..	Sep.	Al..	3	P C.	N	....	N	Til....	N	A-L...	A-L...	D.Own..	Own....	f-Own..	3/4 Own.	4.44 5.12	E-R	I-R.	N	Own.	S-55....	Pr....
Willys Knight.....66	126	32x6.20	Own.....66	6-3 1/4x4 3/4	25.4	236	X	Ch..	Sep.	Al..	7	P C.	R	Pu..	Y	Til....	St	A-L...	DeJo..	P.Own..	Own....	m-Mec..	3/4 Own..	5.11	B-F.	E-R	M	Own.	S-57....	Pr....

KEY TO SYMBOLS

*—At extra cost
†—Balloons at extra cost
½—Semi-floating
¾—Three-quarter floating
A—Air
Al—Aluminum
B—Semi-steel
B-F—Both internal and external four wheels
C—Centrifugal
F—Full floating
CI—Cast iron
Cm—Central magazine
Cu—Oil and grease cups
D—Multiple disk
E—Full elliptic
E-F—External four wheels
E-R—External rear wheels
E-T—External transmission
F—Fabric
F—Filter
Gr—Grease cups
H—Horizontal (valves)
H—Hydraulic (brakes)
He—Helical gear
I—In head
In—Inertia
Int—Integral
I-F—Internal four wheels
I-R—Internal rear wheels
J—Three-quarter elliptic
K—Cone
L—L head
m—Metal
M—Mechanical
N—None (oil cleaner)
N—Platform (rear springs)
O—Optional (brakes)
O—Special type (rear springs)
Oc—Oil cups
Ow—Oil cups with wick feed
P—Single plate
Pr—Pressure gun
PC—Pressure to all crankshaft and connecting rod bearings
PF—Full pressure to all bearings
PK—Pressure to crankshaft, connecting rods and camshaft bearings
PS—Splash with pressure
Pu—Pump
Q—Quarter elliptic
R—Rectifier
S—Semi-elliptic
Sep—Separate
Sp—Splash (lubrication)
Sp—Spur gear (camshaft drive)
Spe—Special make
St—Strainer
Sta—Standard
T—T head
Th—Thermo-syphon
V—Cantilever
Wat—Watford
X—Sleeve valve
Y—Yes

ABBREVIATIONS—NAMES OF MFRS OF STOCK PARTS

A-K—Atwater Kent
A-L—Auto-Lite
Ada—Adams
Al—Alemite
Ans—Ansted
B&B—Borg & Beck
B-L—Brown-Lipe
Bas—Bassic cups
Bij—Bijur
Bo—Bowen Products
Car—Carter
CAS—CAS Products
Cle—Cleveland
Cli—Climax
Con—Connecticut
Conn—Connecticut
Col—Columbia
Cpl—Campbell
DeJo—DeJon
Det—Detroit
Dit—Ditweiler
Do—Dot
Due—Duesenberg
Dur—Durston
Dyn—Dyneto
Eat—Eaton
En—Enots
Fli—Flint
Ful—Fuller
Gem—Gemmer
Hoo—Hoosier
Jac—Jacox
Joh—Johnson
Kin—Kingston
L-N—Leece-Neville
Lav—Lavine
Lyc—Lycoming
M&E—Merchant & Evans
Mar—Marvel
Mec—Mechanics Machine Co.
Mon—Monson
Mun—Muncie
N-E—North East
Nor—Northway
Pet—Peters
Ray—Rayfield
Roc—Rockford
Sa—Saal
Sal—Salisbury
Sch—Schebler
Sne—Snead
Spe—Special Make
Spi—Spicer
Spl—Splitdorf
Ste—Stewart
Stl—Sterling
Str—Stromberg
The—Thermoid
Thi—Thiemer
Til—Tillotson
Tim—Timken
Uni—Universal
W-G—Warner Gear
Wag—Wagner
War—Warner
Wes—Westinghouse
Wis—Wisconsin
Ze—Zerk
Zen—Zenith

A New Line of Cadillac Cars

THE simplest, quickest way to convey to you an adequate conception of these new Cadillac cars—the most superlatively beautiful line that Cadillac has ever produced—is to record a practical and highly important fact.

Providing, by means of new engineering, a new standard of beauty, a new measure of ease and a new brilliancy of performance unequaled in Cadillac history—and true to all the fine Cadillac traditions

All of Cadillac's 23-year experience in manufacturing fine cars—the last 11 years with eight-cylinder cars exclusively—unites with Cadillac's latest engineering conceptions in producing this new creation.

That fact is that, in the development of these new cars, Cadillac has expended more than $2,500,000 in jigs, tools and dies alone for the *purpose of producing the finest Cadillac in history.*

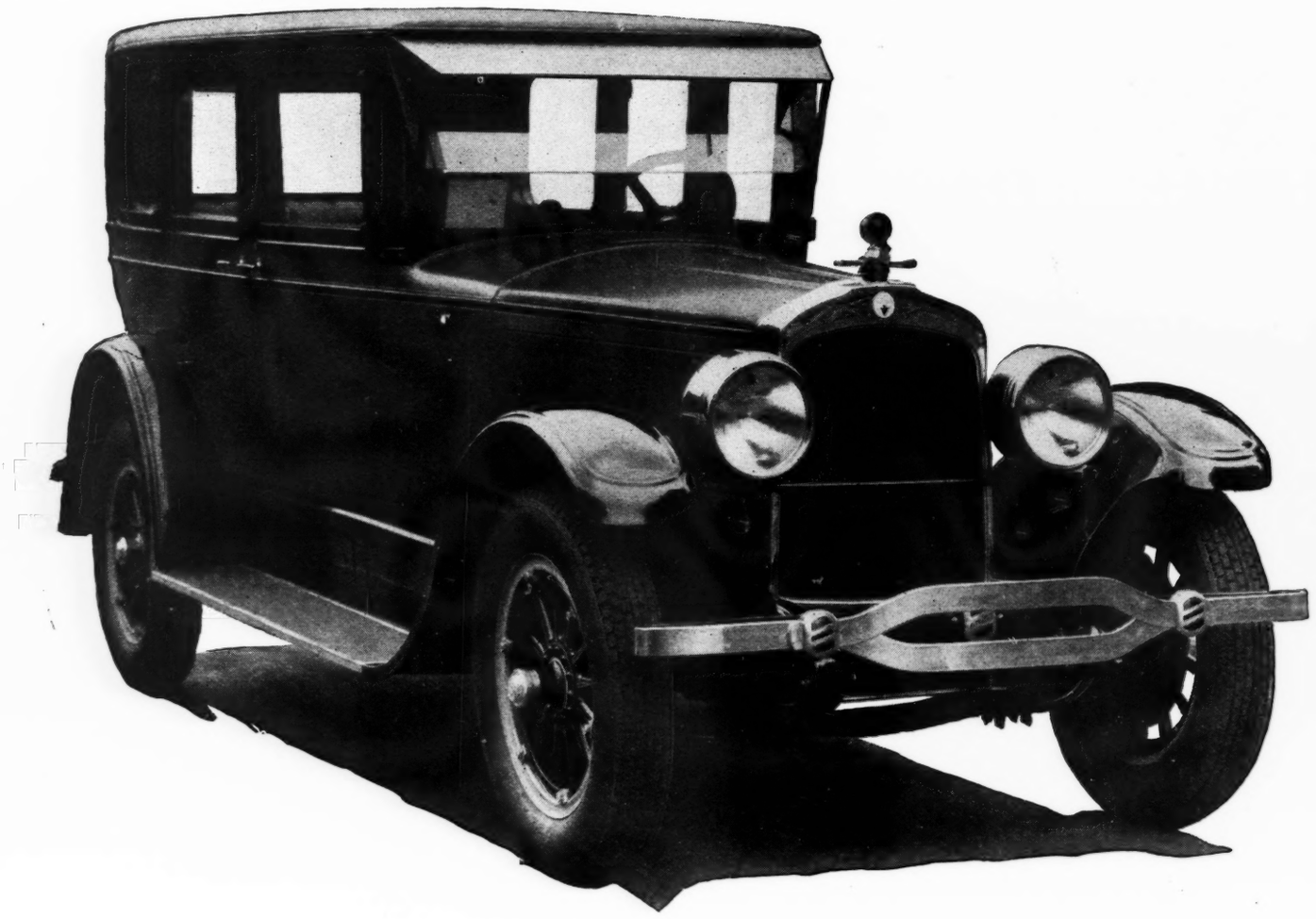
All of the resources—engineering, purchasing and manufacturing—of both Cadillac and General Motors have been brought to bear upon this paramount object.

We are certain that you will share our opinion that the new line of eight-cylinder Cadillac cars not only surpasses all others in every important essential, but goes far beyond Cadillac's previous best.

The new Cadillac cars are now being shown by Cadillac Dealers everywhere.

CADILLAC MOTOR CAR COMPANY

Division of General Motors Corporation



Such Beauty Deserves Biflex Protection

We know a charming someone with dancing eyes and tousled hair who was just *made* for vacations—

On the golf links, she has an easy natural swing that sends the ball far down the fairway.

She can dive and she can swim; she's master of a surfboard. And every fellow knows about her dancing!

Of course, she owns one of the fine cars—to suit the youth, the verve, the sheer joy of living that is hers.

And, of course, it's Biflex guarded. For her car must be well dressed from stem to stern, and every part must harmonize with its poise and distinction. And only Biflex could be trusted to safeguard this charming girl.

B

O. G. HEFFINGER, PRESIDENT — EDWIN BLUTHARDT, SECY AND TREAS

CHICAGO MOTOR CAR COMPANY, INC.

2430-2432 SOUTH MICHIGAN AVENUE

TELEPHONE CALUMET 6070

CHICAGO

June 18th, 1925.

Mr. L. E. McLean,
c/o Biflex Corporation,
Waukegan, Illinois.

Dear Sir:

Just about a year ago, Jordan was beginning the preliminary advertising announcing the "Great Line Sight". A large volume of advertising was run -- full pages in the newspapers, and engraved invitations to owners and friends. All this advertising invited the world to come in Wednesday and drive the new car.

After all this had been done we discovered that the Jordan factory would be able to give us only one car for demonstrating purposes and we sent our superintendent to Cleveland to drive it carefully to Chicago. He arrived here with it on Tuesday morning and we equipped it with Biflex Bumpers. That same afternoon the car was sent out on a final test and one of our men, running fifty-five (55) miles an hour on Wabash Avenue was cut off by another car and ran ahead on into a telegraph pole.

You can fit your own comment to this story when we tell you that we paused only long enough to discharge the man who was driving the car and went right to work on it and had it ready for demonstration on Wednesday morning. We made five sales with it that day. We believe that the Biflex Bumper saved our only demonstrator at a most critical time and thereby saved us much embarrassment and prevented the loss of business that would have mounted into many thousands of dollars.

Since then practically every Jordan Line Sight delivered in this territory has been Biflex equipped - front and rear. Every car on our show-floor and every car our dealers show, both in the city and country, as well as all demonstrators, carries two Biflex Bumpers. These are considered as a part of the regular equipment and are included in the price of the car to the customer.

Very truly yours,

CHICAGO MOTOR CAR COMPANY, INC.

Edwin Bluthardt

Secretary & Treasurer.

EB:Lb

"To save your life, you can't get better protection" is nowhere more forcefully illustrated than in this letter written by Edwin Bluthardt, Secretary and Treasurer of the Chicago Motor Car Company, Inc., to the Biflex Corporation. Mr. Bluthardt is one of many Jordan representatives who are profiting by a practically exclusive use of Biflex bumpers on Jordan cars.

biflex

THE BIFLEX CORPORATION, WAUKEGAN, ILL.

(39)

Smoothest, Easiest Riding Over Roughest Roads

A similar attractive full-page advertisement appeared in the Saturday Evening Post July 25th

STROMBERG SUPER SHOCK ABSORBERS

Sold and Guaranteed by the Builders of the Famous Stromberg Special Carburetors

Twelve Special Features

1—Designed on a new and better principle.
2—Regulate spring action to exactly the correct degree under all driving conditions.
3—Provide smooth, easy riding with either Balloon or Standard Tires.
4—Working parts protected against dirt, water and oil.
5—Heavy steel cable will not break, stretch or rust.
6—No adjustments are ever necessary.
7—No greasing or oiling required.
8—Operate uniformly Summer and Winter.
9—Built to measure for each make of car.
10—Last as long as your car.
11—Sold and guaranteed by a leading and responsible manufacturer.
12—Each set in separate package which contains all necessary fittings for installation.

Prices of Individual Package Equipments, complete with all fittings necessary for installation, for the following cars:

Buick (Stand. Six, Master Six)	$35.00	Jewett	$35.00
Chandler	35.00	Maxwell	35.00
Cleveland	35.00	Nash	35.00
Dodge	35.00	Oakland	35.00
Essex	35.00	Oldsmobile	35.00
Hudson	35.00	Reo	35.00
Hupp (Four Cyl.)	35.00	Studebaker (Stand. Six, Spl. Six)	35.00
		Willys-Knight	35.00
Ford	$12.50	Overland	$14.00
Chevrolet	24.75	Star	24.75

Standard sets of four for all other makes of cars weighing less than 4000 pounds, $35.00 (separate pairs for front or rear for all other makes of cars, complete with fittings $17.50). All prices slightly higher on Pacific Coast and Canada—Prices and information on all other makes of cars, on application

When you equip a car with Stromberg Super Shock Absorbers you can rest assured that they will give the greatest possible degree of riding comfort.

Absolute satisfaction to the buyer in the ease with which his car rides and drives over rough roads; absolute satisfaction to you in the freedom from annoying and expensive service.

These, briefly, are the outstanding characteristics which make Stromberg Super Shock Absorbers big sellers and profit-makers. The whole story of their superiority is told in the Twelve Features opposite.

It will pay you to read them, and then send for complete information, as well as our advertising and merchandising plans, and our

Liberal Dealer's Proposition

STROMBERG MOTOR DEVICES COMPANY
68 EAST 25th STREET, CHICAGO

Direct Factory Branches:

NEW YORK 517 West 57th St. | BOSTON 760 Commonwealth Ave. | DETROIT 2739 Woodward Ave. | MINNEAPOLIS 1609 Hennepin Ave. | KANSAS CITY 1809 McGee St. | LONDON, W. 1 ENGLAND 173-75 Cleveland St.

Best for Balloon Tires

The Motor Jacks the Wheel and Up Go Your Profits

Will any sane driver want to go on jacking by wrist power when the twenty or thirty horsepower in his engine can be made to do the work?

Can any dealer fail to find a big demand and quick sales, once his customers get the idea?

All you have to do is stock Jiffy Jacks, put in our window and counter displays, and demonstrate now and then. You'll soon sell a flock of these jacks.

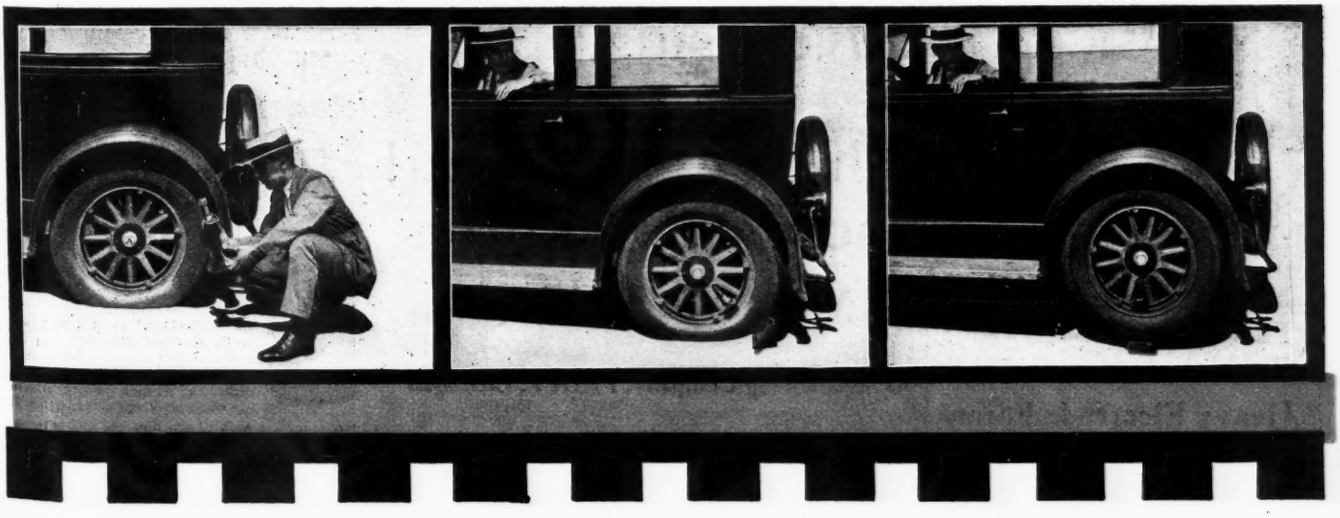
The Jiffy Jack is just clamped to the wheel by turning one nut. Then drive up on it and the wheel is jacked. Absolutely simple, safe and strong.

If your jobber hasn't yet stocked this *new* jack, write to us, giving his name. Get your stock now before all the other dealers start.

It's the biggest selling idea of any jack ever made. Try it!

Bitler, Haines & Liddle, Inc.
Berks County Trust Bldg.
Reading, Pa.

THE NEW **JiffyJACK**



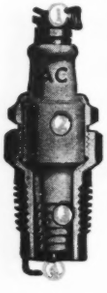
What AC Means to the Dealer

AC Spark Plugs

More than 80% of all the cars produced in this country, Fords excluded, are factory equipped with AC Spark Plugs. Among these cars are:

Apperson	Dodge Brothers	Maxwell
Buick	Durant	Nash
Cadillac	Essex	Oakland
Case	Flint	Oldsmobile
Chandler	Hudson	Paige
Chevrolet	Hupmobile	Star
Chrysler	Kissel	Velie
Cleveland	Marmon	Westcott
Davis		Wills Sainte Claire

AC 1075 for Fords



One glance tells the whole story — Why the AC 1075 is an especially good plug for Fords—Here are its features:

1. Spring Terminal Clip
2. Heavy Body Porcelain
3. High Temperature Fins—Patented Carbon-proof Porcelain
4. Heavy Electrode Forms Natural Oil Drain.

Dealers who carry a good stock of AC products can build a profitable business. The demand is assured because of their use as car equipment.

* * *

Backed by strong advertising.

* * *

They afford you the margin of profit you should get.

AC Spark Plug Company, FLINT, *Michigan*

Makers of AC Spark Plugs—AC Speedometers—AC Air Cleaners

AC-SPHINX
Birmingham
ENGLAND

AC-OLEO
Levallois-Perret
FRANCE

AC Speedometers

The Model for Fords

Miles per hour, miles per trip, total mileage—it tells them all.

Simple direct drive is a big improvement over previous types of drives as it does away with the swivel joint.

Complete with all attachments and once installed is a source of constant satisfaction. The cost is surprisingly low—$15. ($21.00 in Canada.)

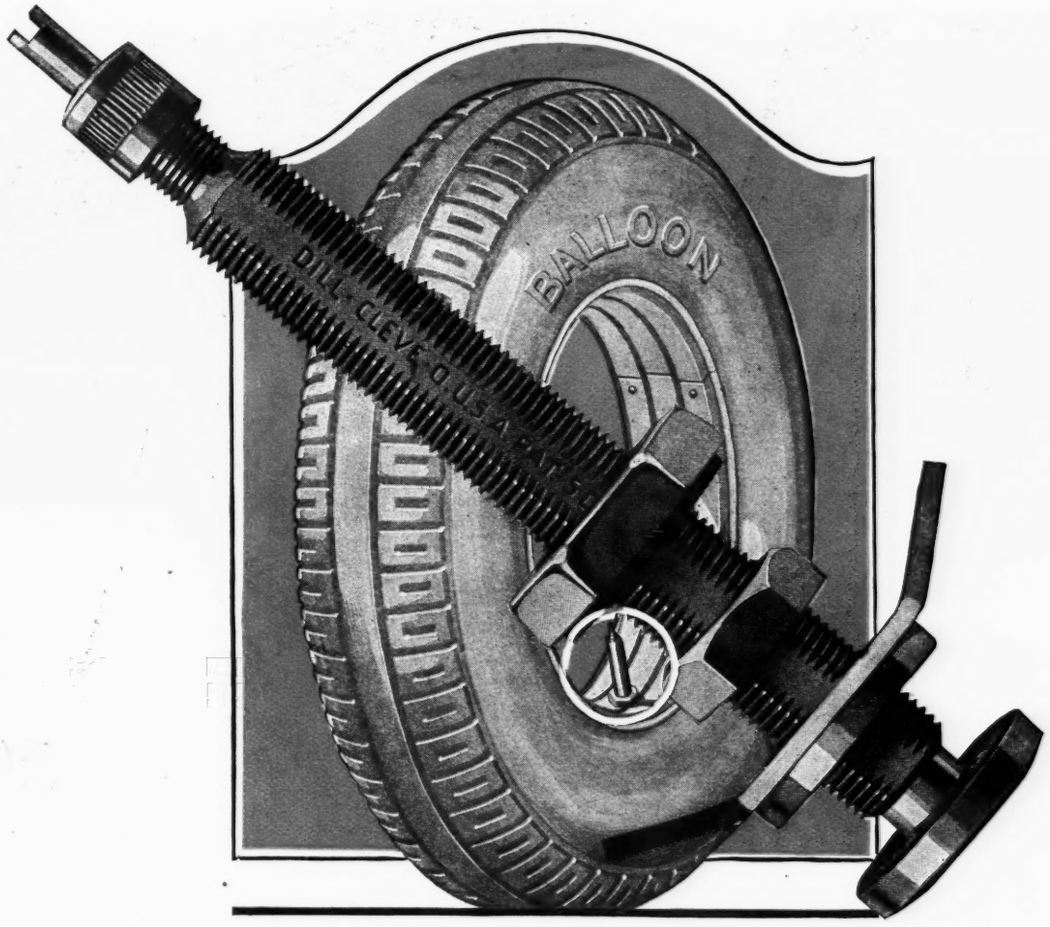
That AC Speedometers can be depended upon for trouble-free operation, is evidenced by the fact that they are original equipment on such cars as Buick, Cadillac, Chevrolet, Chrysler, Gray, Maxwell, Oakland, Oldsmobile and GMC Trucks.

AC Air Cleaners

Easily installed as it connects directly to the carburetor.

Once installed it requires no attention, having no moving parts to get out of order, and its high permanent cleaning efficiency keeps down repair bills.

Comes complete with all attachments and is reasonably priced—$5.00 to $7.00 ($7.00 to $10.00 in Canada) depending on the size required.



Balloon Tires Must Have Dependable Valve Equipment

CONSTANT, unvarying pressure is absolutely essential in low pressure tires. A couple of pounds loss of air cuts down mileage—shortens the service that's actually built into the tire. That is why so many well known tire manufacturers are using the highly dependable Dill Valves and Valve Parts. It's why thousands of dealers find a rapidly growing demand for Dill Valve Insides and the famous Dill Instant-On—dust and valve cap—combined.

THE DILL MANUFACTURING COMPANY · *Cleveland, Ohio*

Manufactured in Canada by The Dill Manufacturing Company, of Canada, Ltd., Toronto

DILL

Standard Tire Valves and Valve Parts

A turn in the road—
Sudden danger ahead,
Both brakes were applied,
Both worn to a thread,
And two objects meet
With a terrible thud—
Man thrown from his seat,
Into two feet of mud.
Two feet isn't bad,
But you've not heard the worst,
It's the way that he landed,
He's standing head first.
MULTIBESTOS
REG. U. S. PAT. OFF.
BRAKE LINING
gives A1 brake service—we give A1 relining service. Bring your car in!
Can you stop when you want to?
IF your brakes do not work properly, if they do not stop your car quickly and smoothly, bring the car here at once.
Let us look after your brakes! You'll find here mechanics who are experts on brake relining. And the cost is trifling to equip them properly with MULTIBESTOS BRAKE LINING.
Said old miser Brown,
With a cynical smile,
"Don't reline my brakes,
They'll do for a while.
Each penny I save
Is a penny I earn;
Garage men must think
I have money to burn,"
But his brakes didn't hold—
To be brutally frank—
And he made a deposit,
I'm told, in the bank.
MULTIBESTOS
REG. U. S. PAT. OFF.
BRAKE LINING
will put your brakes on their best behavior. We'll put a set on your brakes without undue delay or expense.

Good (Natured) Business Getters

The public—especially that part of the public that you do business with—likes a good laugh. You can give them a laugh without the laugh being at your expense. You can do it by distributing the highly amusing new series of Multibestos cartoon cards.

These little cards put the reader in instant good humor, and, at the same time, identify your shop with Good Brake Service.

MULTIBESTOS COMPANY

MULTIBESTOS

REG. U. S. PAT. OFF.

THE SAFE BRAKE LINING

THERE'S A MULTIBESTOS LINING FOR EVERY BRAKE,

Can you Stop when you are Ordered?
Are Your Brakes Safe?
When you hold your car on a down grade you put a terrific strain on the brakes. That is passed on to the brake linings.
It's a matter of a very short time for us to inspect your brakes. If needed, we'll reline them with MULTIBESTOS BRAKE LINING—and your brake troubles will be over.
I bought a used car
From a friend, who enthused,
"She's got four-wheel brakes
And they've rarely been used."
Secure in this feeling,
I stepped on the gas.
Round the bend a steam roller
Was blocking the pass.
I learned that your friends
Make some trifling mistakes,
What that "bus" really had
Was four wheels and no brakes.
MULTIBESTOS
REG. U. S. PAT. OFF.
BRAKE LINING
We install Multibestos linings—heartily recommend them—use 'em ourselves!
Can you STOP when you have to?
Are Your Brakes Safe?
THE brake that will not work is the cause of most of the minor property damage on our streets. It is also a cause of many personal injuries.
Let us look after your brakes! A little first cost for expert labor and MULTI-BESTOS BRAKE LINING may mean a big ultimate saving.

Help *make* Business Better

We supply these cards imprinted with the name and address of stores and shops that give Multibestos service. They come in a complete series of three as shown on this page. They may be used either as mailing pieces or dropped into parked cars. And they never fail to prove real good will builders.

If your jobber doesn't carry Multibestos get in touch with us.

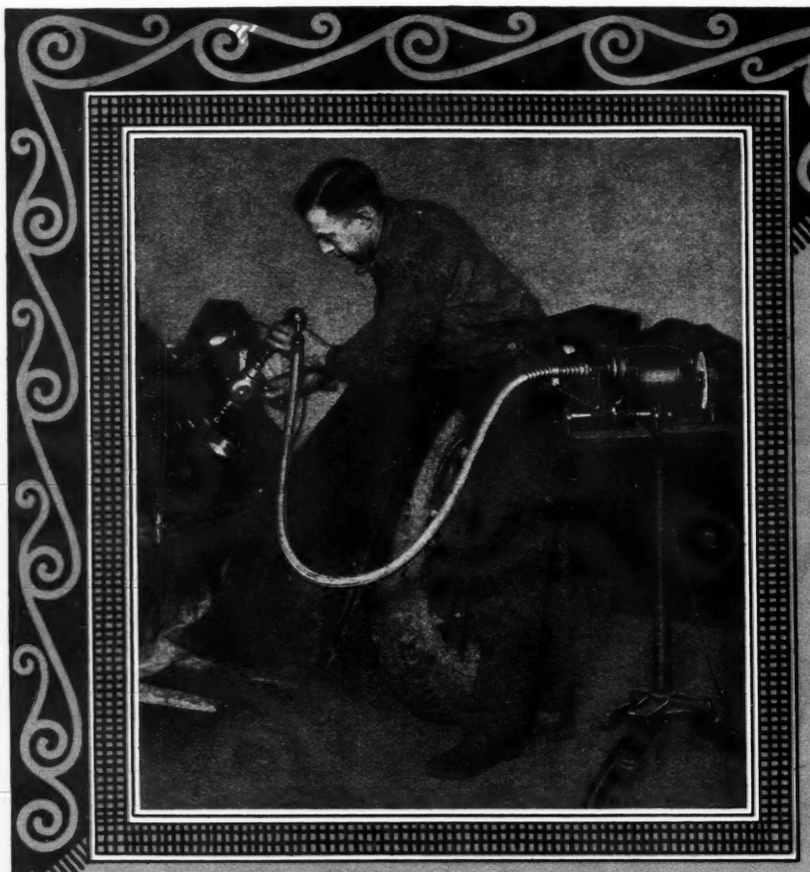
WALPOLE, MASS., U. S. A.

MULTIBESTOS

REG. U. S. PAT. OFF.

THE SAFE BRAKE LINING

TRANSMISSION AND CLUTCH LINING NEED



SIOUX
Trade Mark Reg. U.S. Patent Office

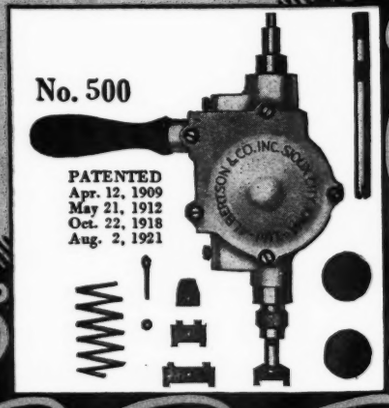
Speed Up Valve Work!

SIOUX VALVE GRINDING ATTACHMENT

For Lapping Valves

IS YOUR shop losing time and money by out-of-date methods for grinding valves? You can lap in any valve quickly and accurately with the Sioux Valve Grinding Attachment. In the average shop it saves hundreds of dollars in one season.

It laps the smallest or largest valve accurately. It gears down and transforms direct forward motion into a reciprocating or back and forth motion, as in the Sioux hand operated valve grinder. Gives you complete equipment for power valve-lapping service. Used with the Sioux Flexible shaft or any small portable drill.



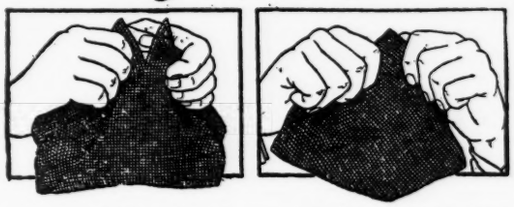
Your Jobber Sells It

ALBERTSON & CO.,
SIOUX CITY, IOWA

GATES BELTS

"The Standardized Fan Belt"

Try this test



Take a piece of light fabric that you can tear easily in this manner—that is, straight across. Then try to tear it diagonally as in the next picture.

You find that it has double strength on the bias—a good illustration of the extra strength and durability of the bias weave construction.

A simple test like this tells your customers the whole story of why they are getting the extra service and satisfaction from the fan belt with the bias weave construction (patented)—the Gates Vulco.

Made by the World's Largest Manufacturers of Fan Belts.

Economy and convenience in welding and cutting are obtained by using the oxygen for both operations with

Prest-O-Lite
DISSOLVED ACETYLENE

THE PREST-O-LITE COMPANY, INC.
Oxy-Acetylene Division

General Offices: Carbide & Carbon Bldg., 30 East 42d St., New York
In Canada: Prest-O-Lite Co. of Canada, Limited, Toronto

31 Plants—60 Warehouses—22 District Sales Offices

A Prest-O-Lite PRODUCT
WORLDS LARGEST MANUFACTURER OF ACETYLENE "THE GAS OF A THOUSAND USES"
BATTERIES FOR AUTOMOBILES, FARM LIGHTING, RAILWAY SIGNALS AND RADIO

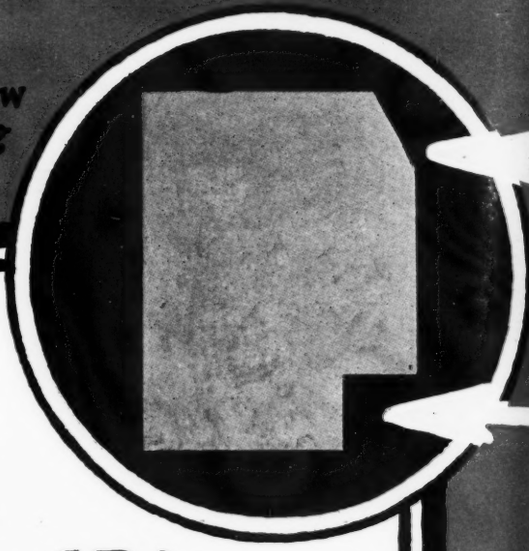
A new Control of lubrication in the cylinder

Developed by

American Hammered

Engineers

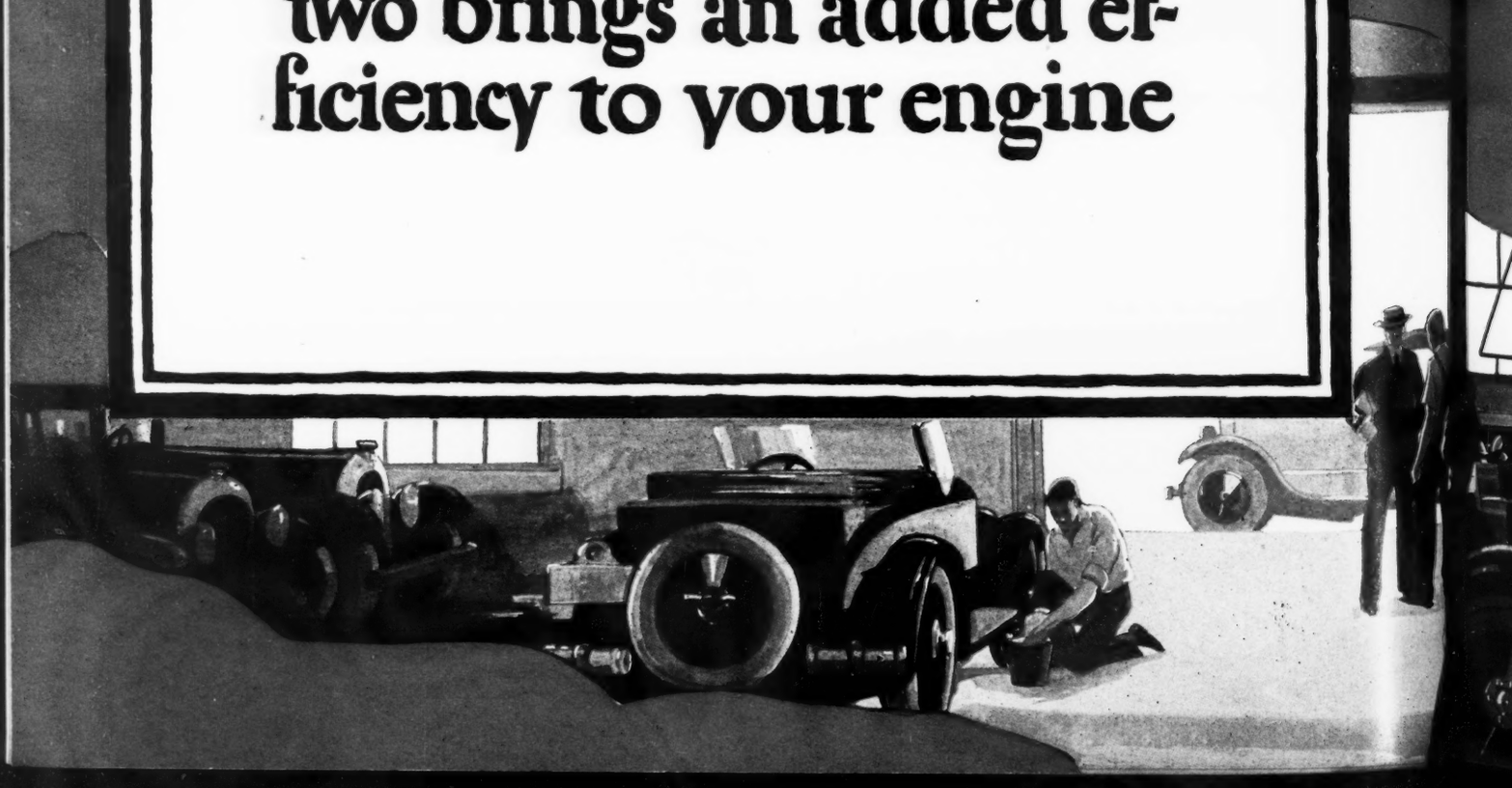
Cross section view
of New Oil Ring



1. The standard American Hammered Ring
~ safeguards your compression

2. This new Oil Ring
~ controls lubrication

The combination of these two brings an added efficiency to your engine



This bevel

— Insures adequate lubrication—spreads a uniform film of oil on the cylinder wall.

This groove

— Prevents excess lubrication—picks up the excess oil from the cylinder wall and directs it back to the crankcase.

THE new American Hammered Oil Ring banishes:

1. *Oil Pumping*

2. *Wear* and *friction due to under-lubrication in cylinders.* It permits just enough oil in the cylinder to give correct lubrication.

Used in conjunction with Standard American Hammered "compression rings," the new oil ring insures maximum efficiency in the cylinders, permanently, at all engine speeds—with minimum gas and oil consumption.

While the standard American Hammered ring has always guaranteed leakless compression, this new oil ring gives an added regulation of cylinder lubrication which has never been known before. The entire automotive trade will welcome this new engineering advance.

The standard American Hammered Piston Ring is now the fastest selling replacement ring on the market. Watch the new oil ring sell with it.

AMERICAN HAMMERED PISTON RING CO.
BALTIMORE, MD.

FACTORY STOCKS

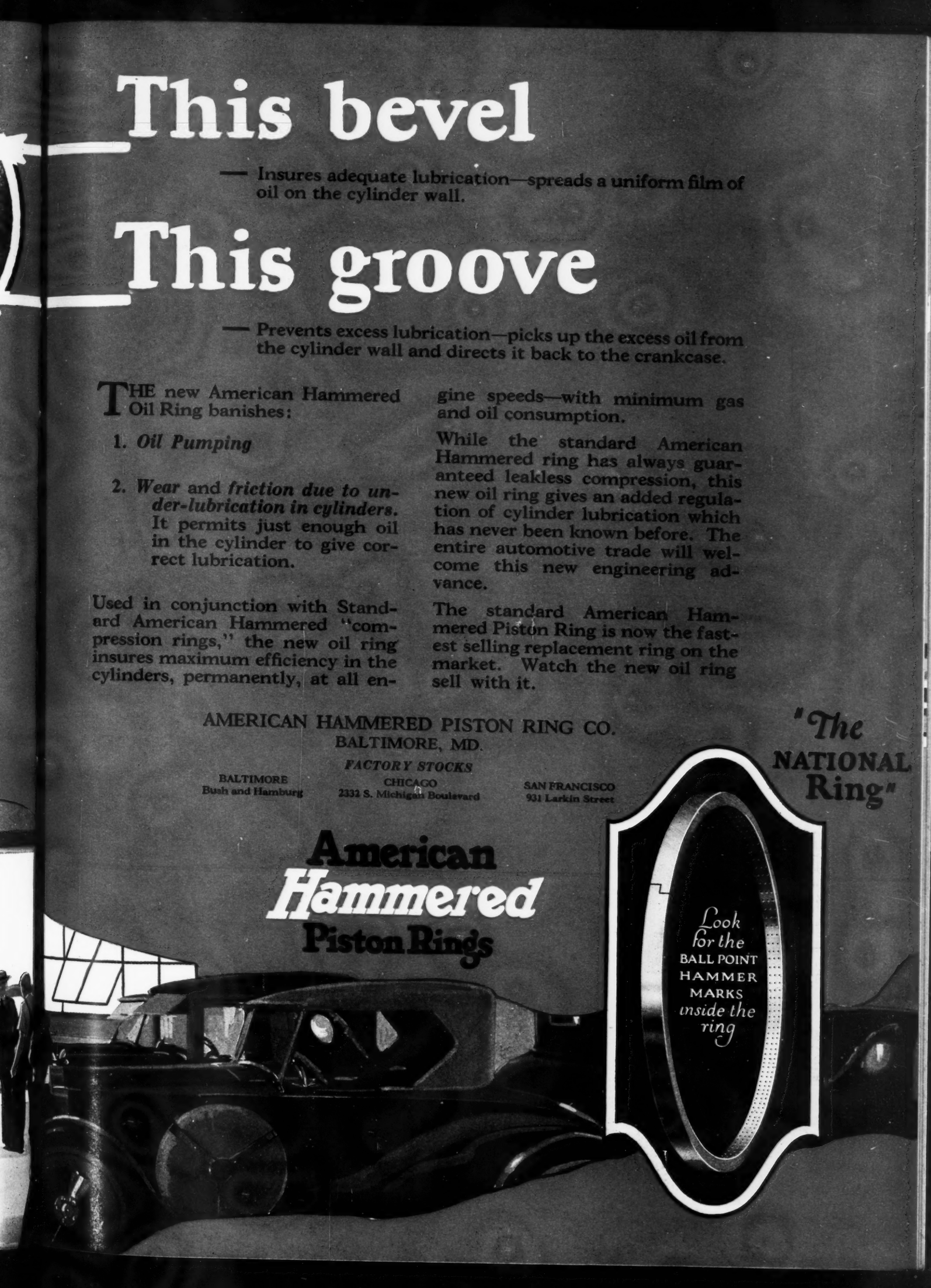
BALTIMORE
Bush and Hamburg

CHICAGO
2332 S. Michigan Boulevard

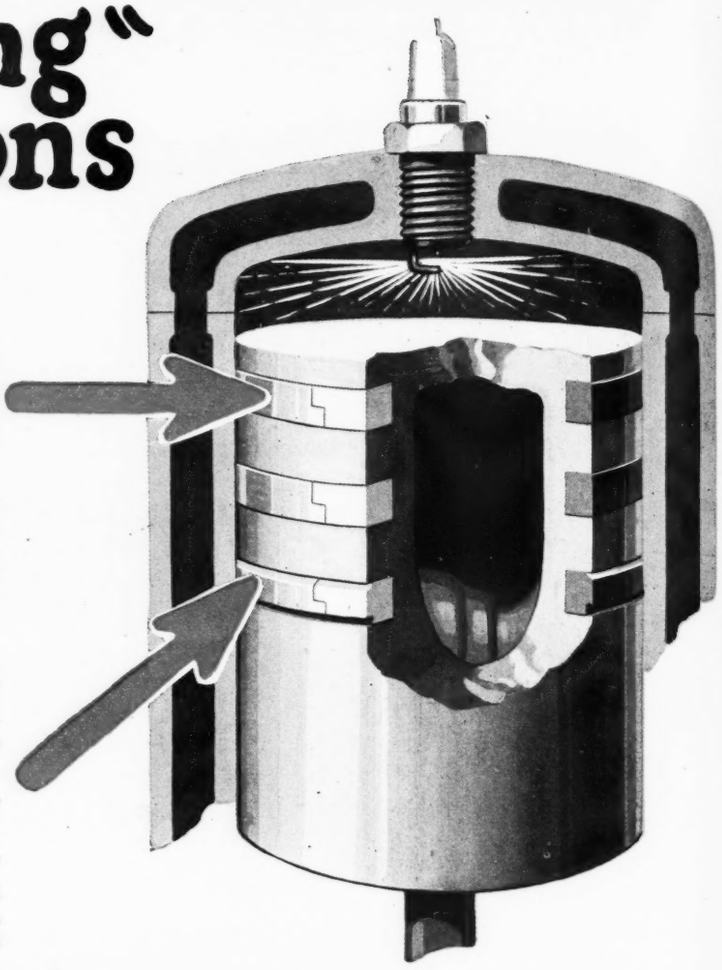
SAN FRANCISCO
931 Larkin Street

"The NATIONAL Ring"

American Hammered Piston Rings



How the new American Hammered "Oil Ring" functions



¶ For complete cylinder efficiency use standard American Hammered "compression rings" in all piston grooves except the lowest one, which may be fitted with the new Oil Ring.

¶ *Bevel:* During the exhaust and compression strokes of the engine the bevelled portion of the ring uniformly spreads a film of oil around the cylinder for adequate lubrication.

Groove: During the explosion and suction strokes the sharp edge of the groove scrapes the excess oil from the cylinder wall and directs it back to the crankcase.

Always enough oil on the cylinder walls—never too much, or too little.

One of the greatest advantages of this oil ring is that it can be used with any type of piston—and does not require any holes to be drilled in the piston rings for an oil drain.

American Hammered Piston Rings

1 An Automotive Instrument of Proven Merit

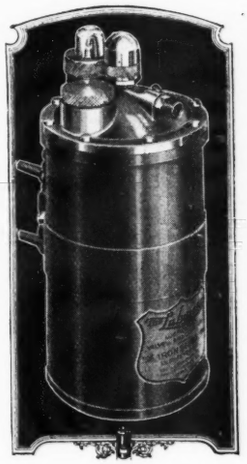
With an instant appeal to every car and fleet owner interested in maximum performance and in economy in operation costs.

2 A Novel, Sure Fire Merchandising Plan

Built around the distributor and dealer and concentrated in the territory selected.

3 Small Investment in Stock—Sensible Discounts

Allowing the distributor and dealer a margin worth working for and assuring quick turnover and quicker profits.



DISTRIBUTORS — DEALERS — EVERYWHERE **—The Luburetor offers to you an exceptionally clean and unique opportunity to approach a virgin market with an automotive instrument of positive usefulness to every automobile engine. It is a basic improvement, engineered to precision, thoroughly sound in principle and proven beneficial to every type of motor. Its market is limited only by the millions of passenger cars, trucks and tractors manufactured and sold.**

GOVERNED by a vacuum controlled piston valve, the Luburetor introduces an independent supply of fresh clean lubricant into the combustion chamber through the manifold at each intake stroke. Operation is completely automatic and the oil feed is accurately regulated in direct proportion to the upper end or actual danger zone in the motor, preventing excessive cylinder wear and adequately lubricating pistons and valves.

You can make money with the Luburetor. Back of it is a novel merchandising plan which has been acclaimed by present Luburetor distributors and dealers as the soundest and most direct plan they have ever seen. This campaign is built around the point of sale. It ties the Luburetor up with the dealer. It deals only with actual prospects, and puts before them a sales message that cannot be denied, one that produces SALES—RESULTS—and PROFITS FOR YOU.

Only three models of the Luburetor are needed to equip every type of motor, from the smallest four to the largest eight, including every passenger car model and all trucks and tractors. This cuts down your investment in stock and permits you to realize more frequent turnover and quicker and easier profits.

The Luburetor, its result producing merchandising plan and its wide-open market deserve investigation by every progressive distributor and dealer in the country. Look into it. Send for complete information, at once, to

THE LUBURETOR COMPANY, Columbus, Ohio

The Luburetor

TRADE MARK REG.

Fill out this coupon or pin it to your letterhead and mail it in today. We will immediately send you a complete description of the Luburetor and tell you all about the new sales plan. Get started at once and increase your summer profits. MAIL THIS COUPON NOW.

The Luburetor Company,
Columbus, Ohio.

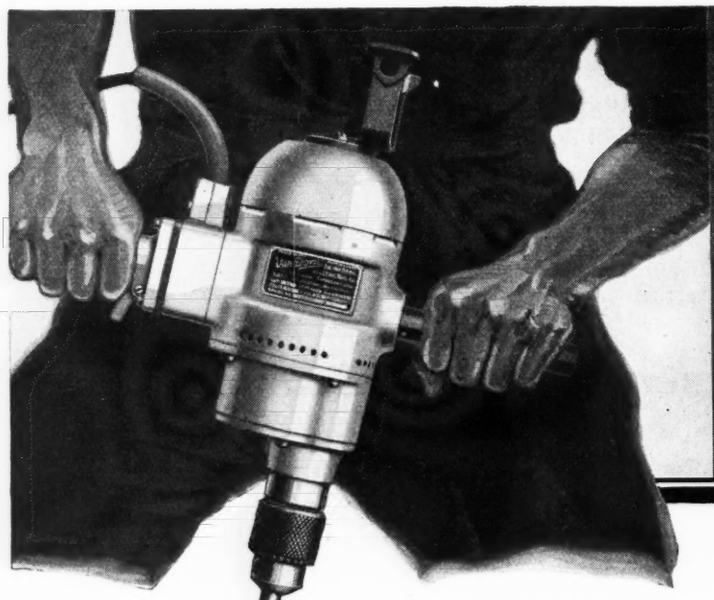
Please send by return mail full description, prices and discounts on the Luburetor. Also outline your merchandising plan.

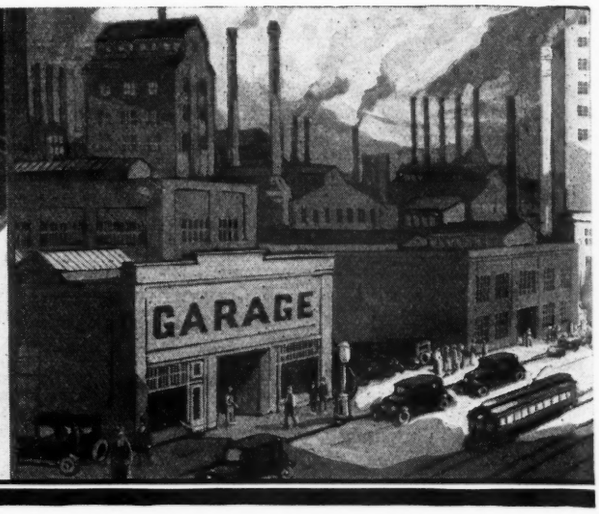
Signed .....

Street .....

City ..... State.....

AGJ-8 MA-8





"Van Dorn" ½" Heavy Duty Electric Drill. Has no equal at its price of $60.00. One of 8 sizes from ¼" to 1¼".

When the Automotive Industry Calls the Roll

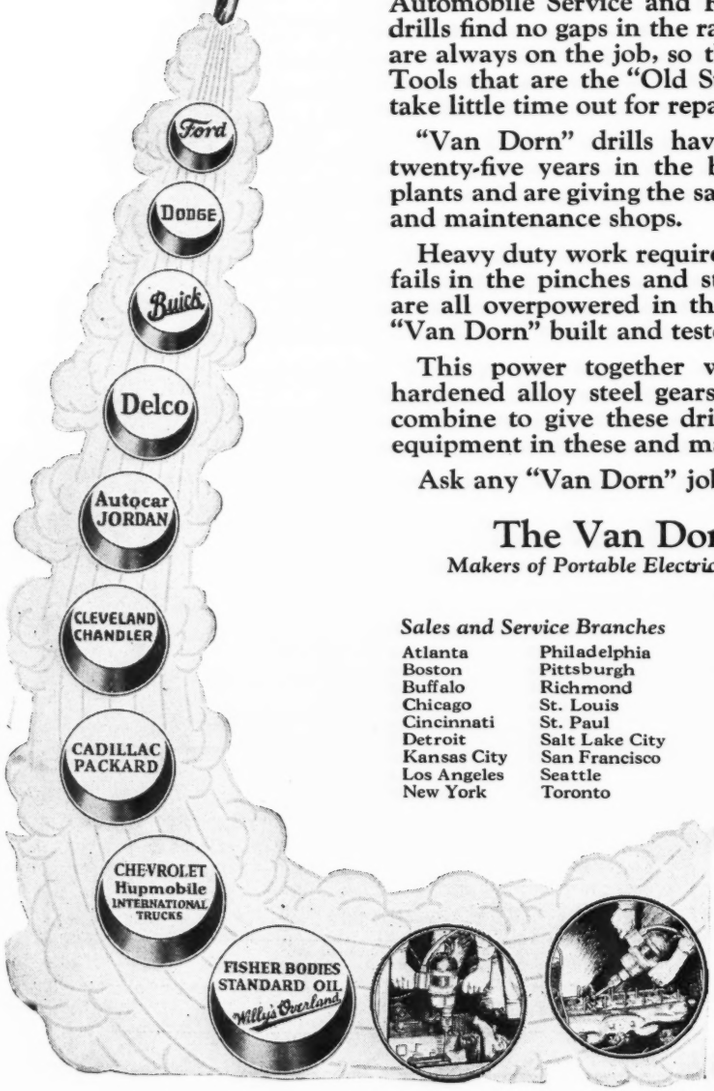
Automobile Service and Repair Shops that use "Van Dorn" electric drills find no gaps in the ranks. As every shop has certain men who are always on the job, so they have certain tools of the same caliber. Tools that are the "Old Standbys", that work all day, every day and take little time out for repairs.

"Van Dorn" drills have answered "present" every morning for twenty-five years in the best motor car, truck, body and accessory plants and are giving the same heavy duty and constant service in repair and maintenance shops.

Heavy duty work requires heavy duty drills. An underpowered drill fails in the pinches and stalls when most needed. "Van Dorn" drills are all overpowered in their particular size, because every motor is "Van Dorn" built and tested.

This power together with their perfect balance, ball bearings, hardened alloy steel gears, quick make and quick break switch all combine to give these drills the endurance that keeps them standard equipment in these and many more large plants.

Ask any "Van Dorn" jobber to prove this by actual test.



The Van Dorn Electric Tool Company

Makers of Portable Electric Drilling, Reaming and Grinding Machines, Etc.

Cleveland, Ohio

Sales and Service Branches

Atlanta	Philadelphia
Boston	Pittsburgh
Buffalo	Richmond
Chicago	St. Louis
Cincinnati	St. Paul
Detroit	Salt Lake City
Kansas City	San Francisco
Los Angeles	Seattle
New York	Toronto

"Van Dorn" ELECTRIC DRILLS

Large Users:

These well known automotive manufacturers are a few of the many business organizations who use "Van Dorn" drills as practically standard equipment. Many of them go still further and recommend these drills to their service stations.

Home and Trade Mark of Brown-Lipe Gear

Transmissions and Clutches

BROWN-LIPE GEAR CO.

BROWN-LIPE GEAR CO., — Syracuse, N. Y.

DU PONT DUCO

UNLIKE ANYTHING ELSE
-- IT IS DUCO, THE BEAUTIFUL, ENDURING FINISH

The day has come when finish really means—FINISH!

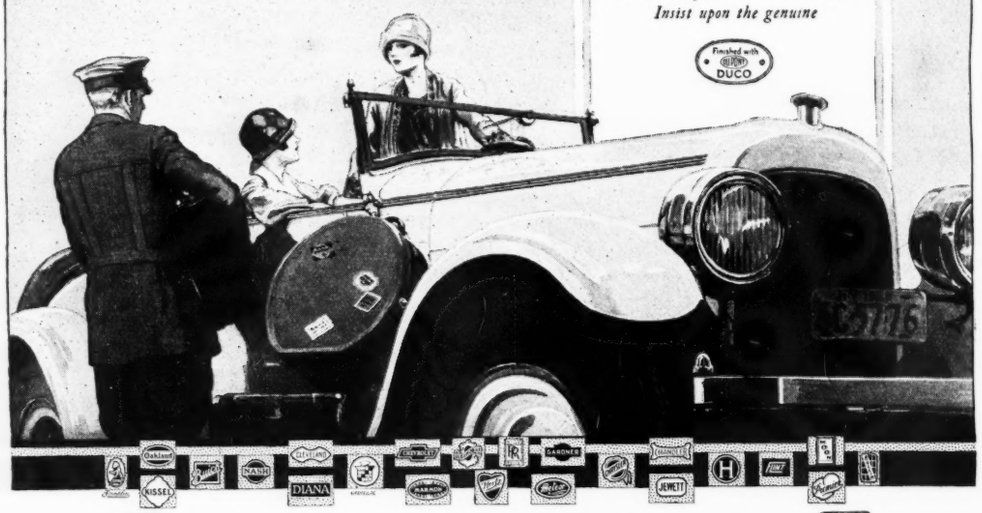
The initial beauty of Duco never needs renewing. Its satiny smoothness and rich color tones fear neither the elements nor the hard usage which automobiles encounter.

Duco is a thoroughbred finish. Quite naturally, it never sacrifices smart, well-groomed appearance.

The years of bustling life which motor-cars must lead leave Duco's lustre unmarred; its newness undimmed

New or old, your car deserves Duco
Insist upon the genuine

Finished with DU PONT DUCO



DUCO is an enduring finish of unusual beauty, not to be confused with any other. It was created and is made *only* by du Pont.

It is waterproof and completely weatherproof.

Mud, grease and oil can quickly be wiped away. It does not check, crack or peel. Alkaline dust or strong soaps do not injure it. It is very easy to clean and to keep clean. Its beauty is life-long, actually increasing as time goes by.

The leading automobile manufacturers, whose trademarks are shown above, now finish cars in this permanent way.

Old cars can be *refinished* with DUCO by any shop displaying the sign of an Authorized DUCO Refinishing Station. Look for this sign as your assurance of getting genuine DUCO.

DU PONT

Whether you intend to buy a new car or to refinish your old one, write for complete information about DUCO. E. I. du Pont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J., Flint, Mich., Chicago, Ill., San Francisco, Cal., Everett, Mass., or Flint Paint & Varnish Limited, Toronto, Canada.

There is only ONE Duco — DU PONT Duco

A typical advertisement, in color, from the DUCO campaign.

Let us examine a car-buyer's mind....

HUMAN NATURE is pretty much the same in the cross-roads village or in the smart metropolis. Everyone wants to own "the best." And, as every manufacturer and dealer know, promptly satisfying that desire is largely a matter of tactful selling; while *continuing* to satisfy it is a matter of "delivering the goods."

Unquestionably, the enduring beauty given by DUCO is a potent factor in *keeping cars sold.* As for lessening resistance when a car is bought . . . two million owners of cars finished with DUCO endorse it; carefully planned DUCO advertising has backed it since its introduction and this advertising is now being greatly expanded. Far and wide, car-buyers will learn that a car finished with DUCO is *the smart thing to own.*

Advertised to every third family in America . . .

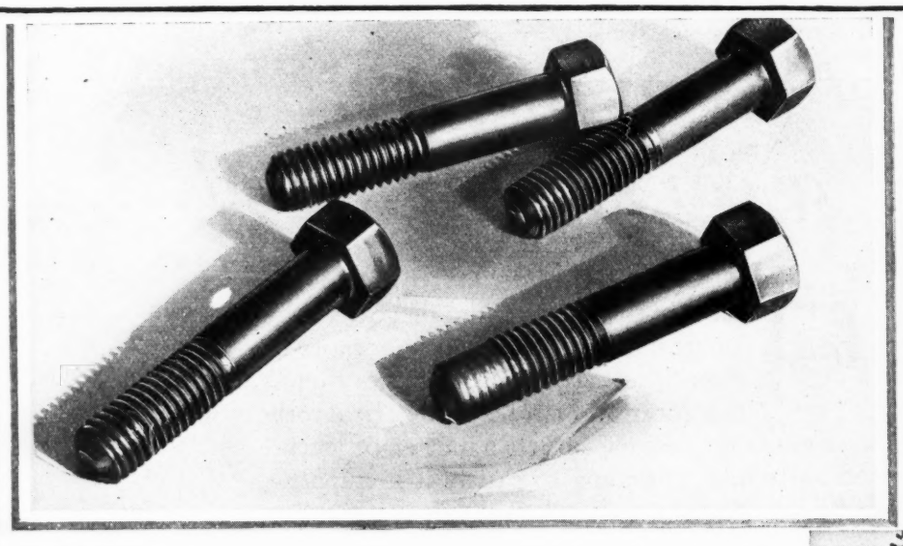
The augmented DUCO campaign is dignified, beautiful, appealing. We have sought to give it that air of unmistakable quality which characterizes so many advertisements of the automobile industry. This striking campaign will be printed in two colors, full color and in black. Beginning with August, it will appear in The Saturday Evening Post, Life, American Magazine, National Geographic, and Town & Country. A typical advertisement is shown on the opposite page. E. I. du Pont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J., Detroit, Mich.

DUPONT

DUCO

REG. U.S. PAT. OFF.

THE STORY OF THE EMPIRE NEW PROCESS BOLT—*Chapter 2. No. 2*



Why tolerate stripped threads when they're no longer necessary?

YOU can strip *any* cut thread, if you try. You can strip a good percentage *without* trying. You are doing it right along. And it is costing you a pretty penny in wasted bolts, lost time, and disgruntled customers.

Out of every lot of cut-thread bolts you buy, so and so many are going to strip when the workman puts the nut on. So and so many are going to strip after the nut is on and the job is delivered. It's as infallible as the Law of Gravitation.

Die Cutting is a Prolific Source of Trouble

You can cut into gold or silver or platinum or lead, and all the harm you have done is to remove a certain amount of metal. The structure of the metal is unchanged.

But not so with steel—especially the fine quality open hearth steel used in making high grade bolts. When you cut into this you disturb the flow of the grain, and the thread is weakened. It takes no tremendous pressure to make the thread give. Every bolt you buy with a die cut thread is a speculation. You don't know anything about it till the nut is on—and not always then.

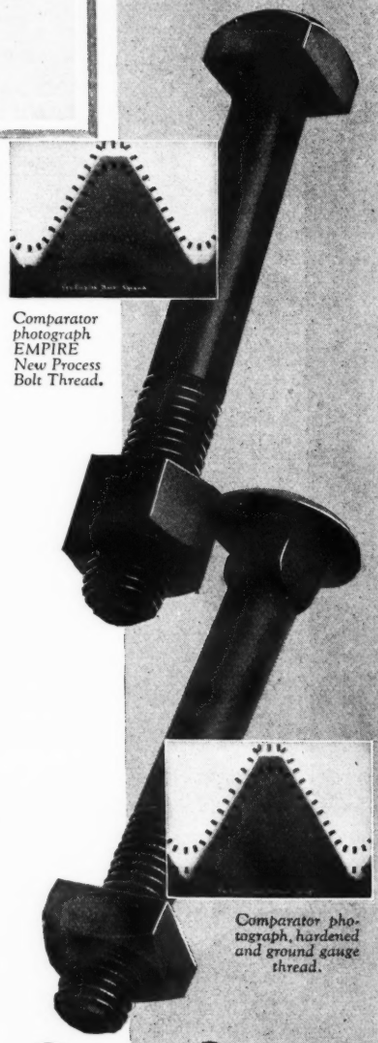
New Way of Thread Making Ends the Stripping Evil

The thread of an Empire *New Process* bolt is not cut. It is *built up* on a specially prepared blank. A new type of die is used. This die, in pressing up the thread, forces the steel molecules closer together. It is like building a wall of solid concrete, instead of loose pebbles. The thread is firm and strong. It cannot be stripped by any nut, under any condition of service.

As many Empire *New Process* bolts as you buy, that many you can use. All will fit. None will strip. Their price is no higher than former Empire bolts, so there is no reason in the world for your not having them and the many economic benefits they bring you.

To know them is to want them. Test them. Ask for samples.

Comparator photograph EMPIRE New Process Bolt Thread.



Comparator photograph, hardened and ground gauge thread.

RUSSELL, BURDSALL & WARD BOLT & NUT COMPANY

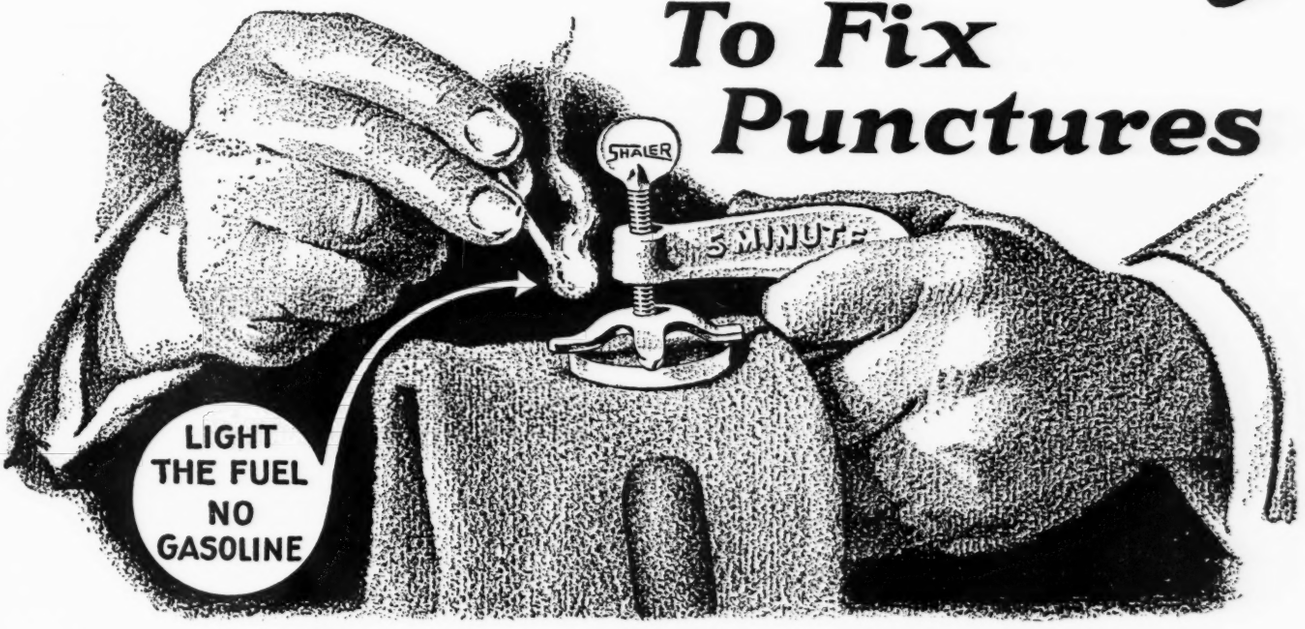
PORT CHESTER, N.Y.

Branch Office: Straus Building	Branch Office: General Motors Bldg.	Branch Factory:	Strimple & Gillette 169 Jackson Street	Maydwell & Hartzell, Inc. 158-168 Eleventh Street
CHICAGO	**DETROIT**	**ROCK FALLS, Ills.**	**SEATTLE**	**SAN FRANCISCO**

Makers of Bolts, Nuts and Rivets Since 1845

EMPIRE New Process BOLTS

The Easiest Way To Fix Punctures



As Easy to Sell as It Is to Use

The Shaler Vulcanizer has been advertised for so many years that most motorists know about it and are ready to buy from the first dealer who says, "Here it is."

This year's advertising in magazines like the Saturday Evening Post is bigger than ever. Write for a Shaler window display and get the good of this

NATIONAL ADVERTISING

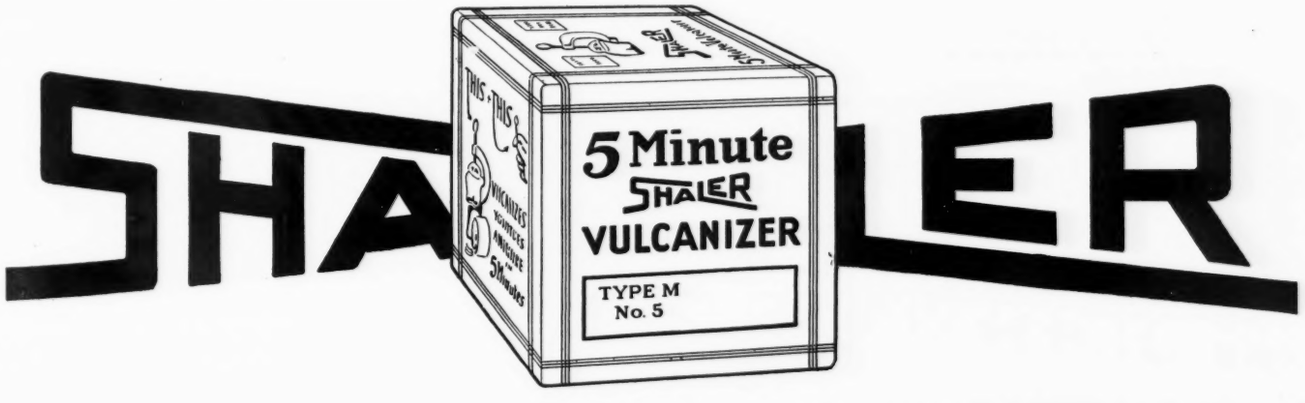
The Shaler Vulcanizer Appeals to Every Motorist Because It Is So Easy and Quick

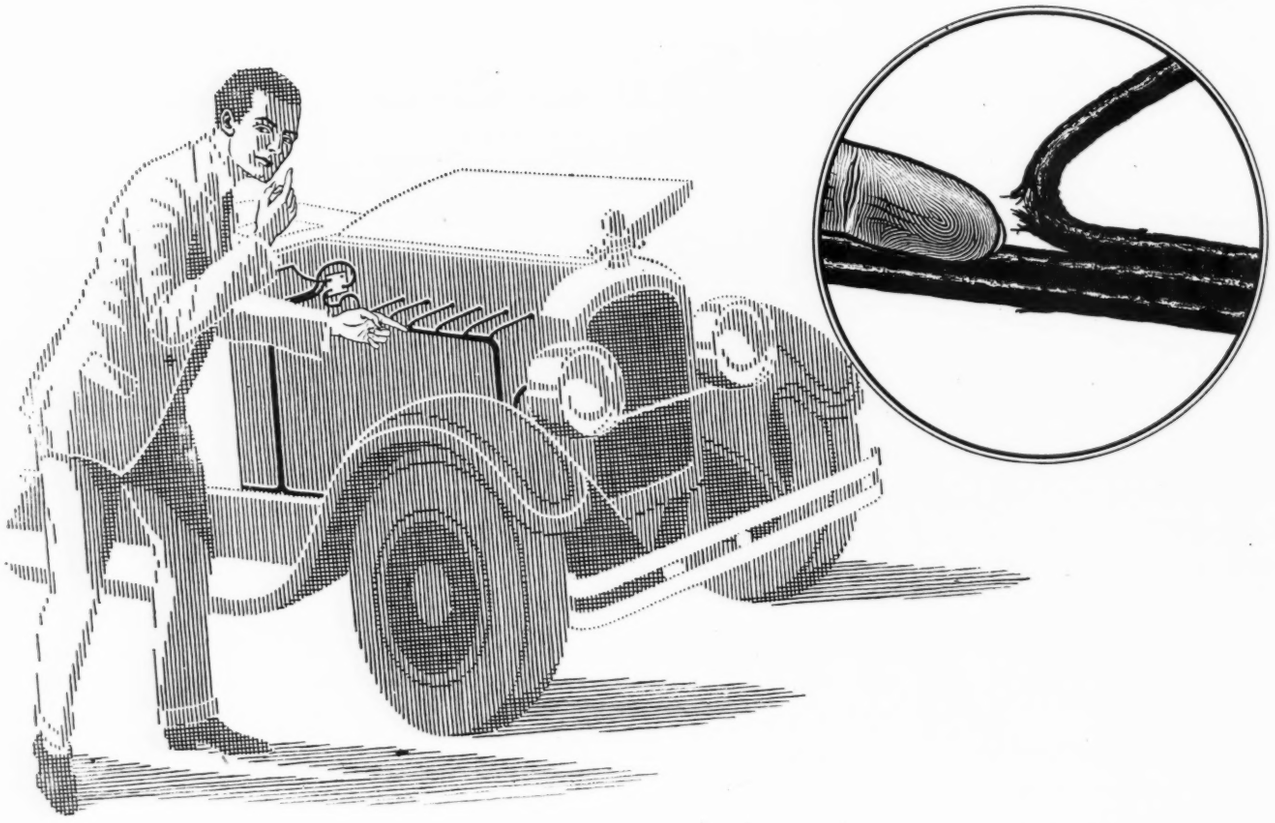
He needs no gasoline, no shears or knife to cut a patch to fit—not even cement—to make a permanent, heat-vulcanized repair when he is stuck on the road. He just clamps a Shaler Patch-&-Heat Unit over the puncture and lights the solid fuel it contains. It's like a modern rifle compared with grandpa's old muzzle-loader.

Every Sale Brings a Repeat

Forty million Shaler Patch-&-Heat Units were used last year. This was repeat business produced by the sales of Shaler Vulcanizers in previous years. Some recognized dealer in auto supplies always gets this repeat business because neither the Shaler Vulcanizer nor Shaler Patch-&-Heat Units are sold by 10c stores, druggists, peddlers, etc.

C. A. SHALER CO., 210 Fourth Street, Waupun, Wis.





Point It Out

You will be surprised to learn how many of the cars that drive up to your place of business need some of their cable replaced.

Every piece of worn out cable on every car in the United States is an invitation to someone to make an honest dollar (maybe two, maybe three). Accept such invitations as are brought to you, promptly and profitably, by pointing out to the owner that he should have it replaced with Packard.

The owner probably knows nothing about the condition of his cable until you point it out to him, but when he learns that he really needs new cable he will not go long without it.

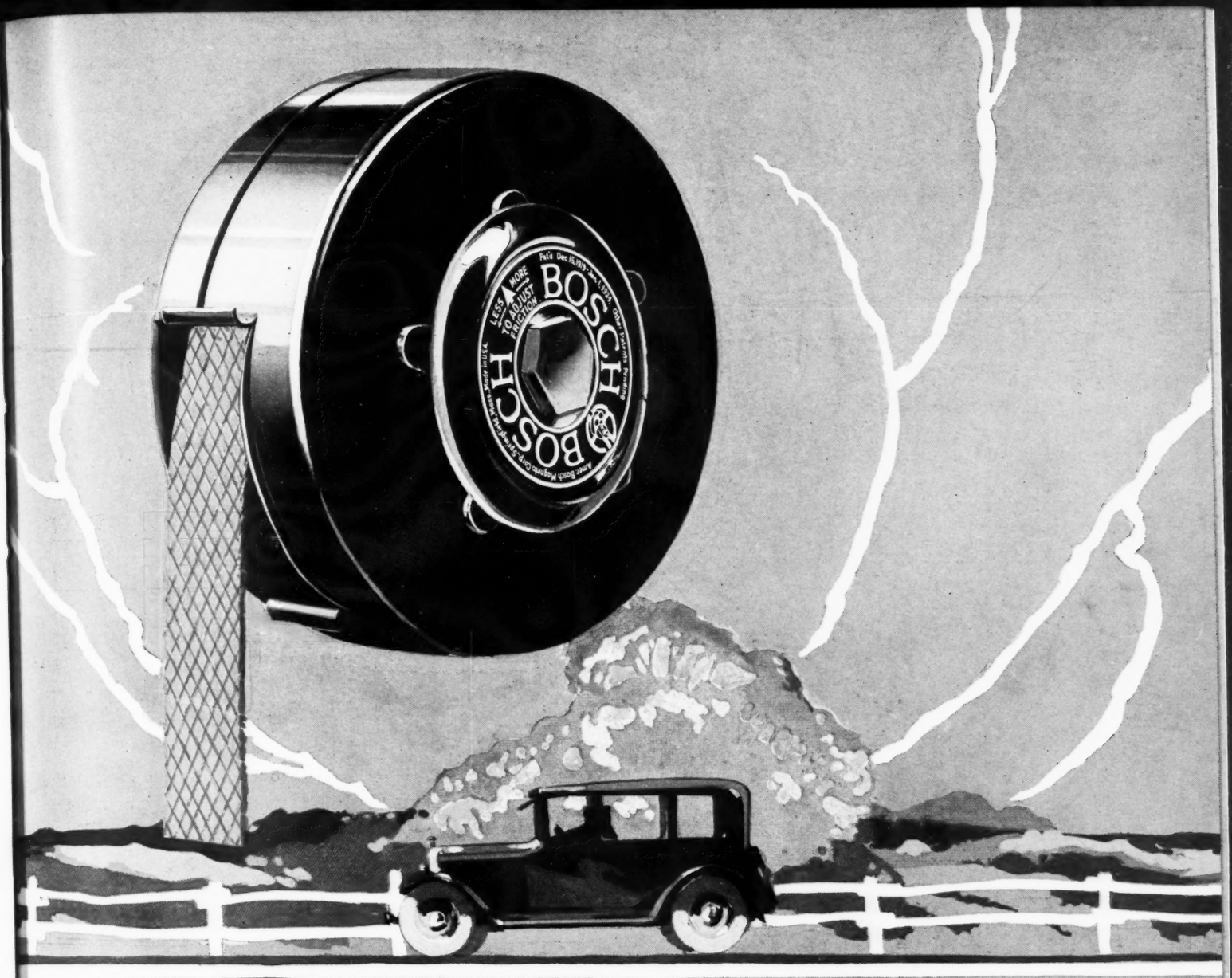
There is a standard style of Packard Cable for every automotive requirement and it can be ordered by trade number from the Packard Wiring Chart. If you do not already have one of these charts, ask your Jobber Salesman for one or write us direct.

Over 300 of the highest class automotive Jobbers in this country carry a full stock of Packard Automotive Cable.

THE PACKARD ELECTRIC COMPANY

Warren, Ohio

Packard is never seen, except on goods of honest value



Smooths the Road

Best for Balloon Tires too —

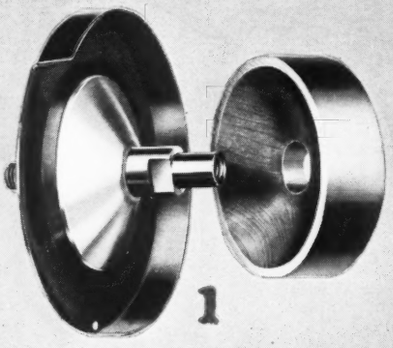
TRADE MARK

The Bosch Shock Absorber is a real QUALITY unit, which does its job in a thoroughly efficient manner. It is backed by the Bosch reputation and guarantee, which inspire confidence and make sales easy. Specialize on the

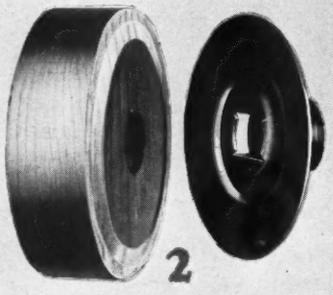
BOSCH

SHOCK ABSORBER

The BOSCH Shock A

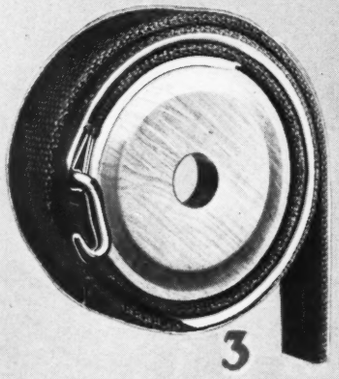


BACK COVER ASSEMBLY and SELF LUBRICATING WOOD FRICTION BLOCK. A steel friction cone is fastened to the inside surface of back cover by the center bolt.
One side of the wood friction block is shaped to fit over the steel friction cone. When in use, the block rotates in both directions, and the friction between the two surfaces dissipates the energy of the shock.



This view shows opposite side of WOOD FRICTION BLOCK, with flat and tapered face, also inner side of FRICTION DISC and HUB ASSEMBLY.

The friction disc is shaped to fit the surface of the wood block against which it rests. The hub assembly has inner flat sides which fit over the flat sides of the center bolt, holding it stationary.



BELT and FRICTION BLOCK ASSEMBLY.

The belt is wrapped around the friction block and held in position by a belt shoe and metal guide. The belt shoe and webbing grip the outer edge or periphery of the block. When the belt is pulled out, the block is rotated in one direction. When the pull ceases, the coil spring rotates the belt and block assembly in the opposite direction.

How it works

The Bosch is not merely "another shock absorber," nor is it a snubbing device. While outwardly similar to other makes, it is very different in design, and in method of operation.

The Bosch Shock Absorber does not interfere when the car spring is compressed, but it becomes effective instantly when the spring starts to expand, and absolutely controls its action during the entire rebound period. It eases the spring back into its normal position—smoothly and promptly, but never with a final jerk that jolts the passengers and causes a new series of minor shocks or vibrations.

The Bosch Shock Absorber utilizes the forces of spring and frictional resistance, each in proportion to the need for it, both being scientifically combined so as to give the greatest riding comfort.

Operating Parts

The three principal operating parts are: a large flat coil spring, a specially treated wooden friction block and a belt. The belt is not used as a friction or wearing member, but simply connects the shock absorber to the car axle.

The coil spring brings the belt and friction block back to a "rest" position, and keeps the belt taut at all times. The wooden block offers a frictional resistance when the belt is pulled by the rebound of the car spring.

Operation

A pull on the belt is met by a gradually increasing force as the coil spring winds up, and as the wood friction block is forced to rotate against two steel surfaces. When the pull on the belt is reduced, the stored up energy in the coil spring causes it not only to unwind, but also to rotate the friction block in the opposite direction.

Adjustment

The frictional resistance can be easily adjusted to meet tire and spring requirements, and the car owner's desires. Simply tighten or loosen the adjusting screw on the outside of the shock absorber—it takes less than a minute.

It's not a Snubber, but a

k Absorber is different!

A Necessity with Balloon Tires

Balloon tires are not a substitute for shock absorbers. They cushion the car against minor shocks and vibrations, but are not intended to absorb big bumps and heavy jolts. These are transmitted to the car springs, and cause violent rebounds unless the springs are effectively controlled.

Special types of snubbing devices are being sold for use with balloon tires. Most of these exert a powerful check on severe rebounds, but they do not control minor actions of the car springs.

The Bosch controls minor spring actions gently, preventing side sway but not interfering with the cushioning effect of the balloon tires. The belt is kept taut at all times, thus providing for instant action on the part of the shock absorber when bumps are encountered.

This constant control effectively prevents the galloping and swaying motions which cars develop at certain speeds (even on smooth roads) when equipped with balloon tires.

It has not been necessary to develop a special type of Bosch Shock Absorber to use with balloon tires. Its resistance is not fixed, as is the case with most snubbing devices. You can easily adjust the frictional resistance to meet the requirements of either balloon or high pressure tires.

Advantages of Bosch Design

Instantaneous in action—the belt is always taut.

Unlimited in effectiveness—has wide operating zone.

Readily adjustable—for balloon or high pressure tires.

Repairs not needed—belt does not have to be "taken up" or replaced.

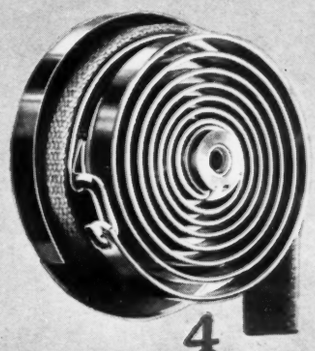
No wearing parts—wood friction block is only moving member subjected to wear.

Easy to install—Bosch universal fitters make installation easy and quick.

Requires little attention—grease needed only once every 10,000 miles.

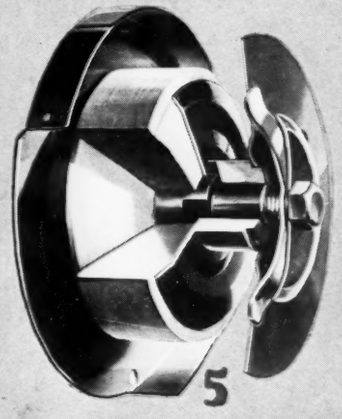
Made in three sizes—

For Fords (3-point Control set, complete)	$16.50 per set
For Fords (in pairs, for Front or Rear)	10.00 per pair
For Medium Weight Cars	15.00 per pair
For Heavy Cars and Trucks	20.00 per pair



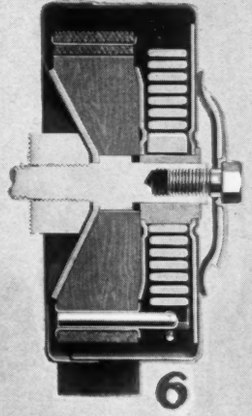
4

WORKING ASSEMBLY COMPLETE. without reinforcing plate and front cover. The inner end of the coil spring is held in a keyway in the center hub. The outer end of the spring is attached to the belt and friction block assembly. When the belt is pulled out, it pulls against the coil spring, and the resistance of the friction block.



5

SECTIONAL VIEW OF ASSEMBLY, without coil spring, to show method of obtaining **FRICTIONAL RESISTANCE.** When the adjusting screw is tightened, it exerts pressure through the star spring against the reinforcing plate and hub, which forces the friction disc tighter against the wood block and increases the friction on both sides of the block. Friction resistance thus applied is **ADJUSTABLE** by tightening or loosening the adjusting screw.



6

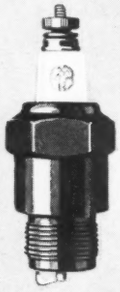
CROSS SECTION VIEW of complete unit, showing the wood friction block pressing against the steel friction cone on the one side, and the friction disc on the other. Note how the tightening of the adjusting screw forces the friction disc against the wood block and increases the frictional resistance. The pressure is exerted through the center hub and not against the coil spring, which has ample room to operate without interference.

ut a Rebound Controller

Profit Makers!

Electric Windshield Wiper

Shock Absorber



Spark Plug

Ignition Coil

The BOSCH Long Line of Automotive Necessities

Here's a complete line of Quality accessories—all made by one firm. It's no longer necessary to deal with one company selling shock absorbers, another selling spark plugs, etc. If you handle the Bosch Long Line, you have the selling rights to 10 popular accessories—every one high grade, thoroughly dependable, moderately priced and a real necessity.

You have the Bosch reputation and prestige to back you up, Bosch advertising and dealer helps to aid you in selling, and the liberal Bosch discounts to assure good profits.

Furthermore, there are over 2500 official Bosch Representatives throughout the world to keep Bosch Products properly serviced.

Ask About the Bosch Dealer Franchise

You can profit still more by becoming an Official Bosch Dealer. The requirements are simple—the benefits many. Some of the advantages you would get are:—

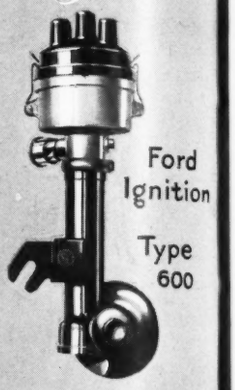
Special discounts on all Bosch material.
Greater profits through increased sales.
Personal assistance from Bosch salesmen.
New markets, and added prestige locally.
Reference books, sales literature, etc.
Sales promotion and advertising service.

For full particulars, fill out coupon and mail TODAY.

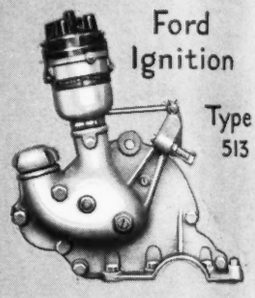
American Bosch Magneto Corporation
Main Office and Works: Springfield Mass.

Branches

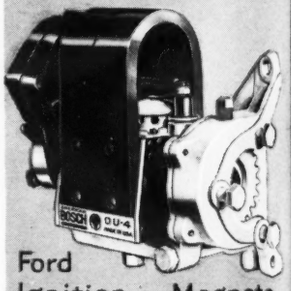
17-23 W. 60th St., New York
3737 Michigan Ave., Chicago
89-95 Hancock Ave. W., Detroit
1262 Post Street, San Francisco



Ford Ignition Type 600



Ford Ignition Type 513



Ford Ignition Magneto Fitting

Fordson Governor

Mail This Coupon TODAY

AMERICAN BOSCH MAGNETO CORPORATION

Send me full particulars about your:

- ☐ Complete line
- ☐ Shock Absorber
- ☐ Windshield Wiper
- ☐ Spark Plug
- ☐ Ford Ignition Systems
- ☐ Fordson Ignition System
- ☐ Fordson Throttle Governor
- ☐ Bosch Dealer Proposition

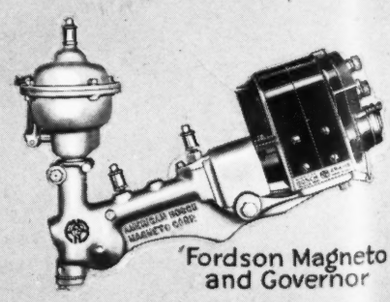
Ship me the following units at quantity discount C.O.D.—

.....
.....
.....

Firm Name.....

Street Address..... City..... State.....

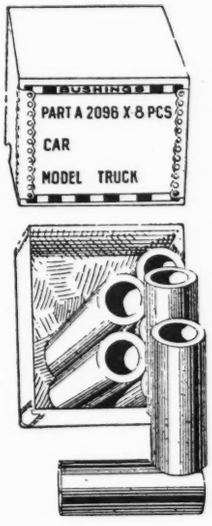
Date..... Signature.....



Fordson Magneto and Governor

Assortment Packed in this Carton

Assortments Which Service 90% of All Passenger Cars



DEALERS, garages and repair shops can now maintain a complete and popular stock of standard quality bronze bushings with small investment by ordering these assortments and simply reordering each box as it becomes empty.

Assortments come packed complete in the large carton shown above and all boxes are clearly labeled with the stock number, model or name of car, and each assortment contains our copyrighted No. 13-A Supplement for reference and cross index, enabling you to immediately find in stock the exact bushings you require.

More than twenty years of experience in the manufacture of phosphor bronze bushings for the automotive trade has guided us in making these well balanced assortments, and every bushing is guaranteed to be equal to or better than the bushing it replaces.

JOHNSON BRONZE COMPANY, New Castle, Pa.

JOHNSON
STANDARD QUALITY

PISTON PIN BUSHINGS
Assortment No. 101

STEERING KNUCKLE & TIE ROD BUSHINGS
Assortment No. 102

SPRING BOLT & GENERAL PURPOSE BUSHINGS
Assortment No. 103

Johnson Bronze Co.
New Castle, Pa.

Mail me the following Bulletins on Assortments No. 101—No. 102—No. 103—

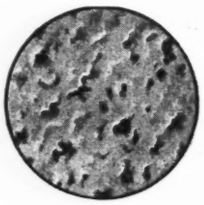
Name .....

Address .....

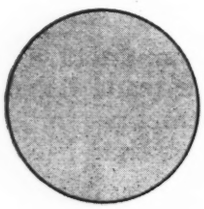
City ..... State .....

Refinishing Success—*or Failure?*

Just This Simple Wash Decides!



Section of a finish 3 months old. The body was not properly prepared. Note how the rust is breaking through.



A finish on a Deoxidine prepared surface after 3 months. Rust germs and paint remover are dead. A smooth, durable finish.

RUST that lurks in the pores of metal bodies and the paint shedding properties of paint removers are constantly working to destroy finishes. A finish is applied, and then, unexpectedly, finger marks appear, the finish checks, peels and cracks—a Failure!

Yet this is preventable. For a simple wash with Deoxidine kills rust, kills the paint shedding properties of the paint remover, assures a *Successful* finish! Over 90% of the car manufacturers combat the destructive forces this way.

The cost of Deoxidine is slight. In fact, it is an economy. Use it on your next job. Get the free test bottle now! There is enough to prepare one car. Use the coupon.

American Chemical Paint Company

Detroit Offices and Warehouse
137 Woodbridge St., E.

General Offices and Factory
Ambler, Penna.

Canadian Factory
Windsor, Ont.

Protect the Paint That Protects Your Product

TRADE MARK

DEOXIDINE

REG US PAT OFFICE

free

American Chemical Paint Co.,
Ambler, Pa.

Without obligating me, please send the free test bottle of Deoxidine.

Name.....

Address.....

features that sell the new Chevrolet

A CHEVROLET SALESMAN finds the factory sales organization right behind him, all the time, helping him to get business.

From the time he meets a likely prospect until the sale is made the Chevrolet sales division is backing him up.

It follows up his calls promptly through the mails. It supplies him expert sales advice to meet every sales situation.

A service, new to the automobile business, but tried and proved in other fields, helps him to cut down useless calls and get the orders.

This factory sales cooperation, together with Chevrolet's quality at low cost, makes selling Chevrolets a steady, remunerative occupation.

CHEVROLET MOTOR COMPANY, DETROIT, MICH.
DIVISION OF GENERAL MOTORS CORPORATION

CHEVROLET

for Economical Transportation

QUALITY AT LOW COST

Get Your Money's Worth

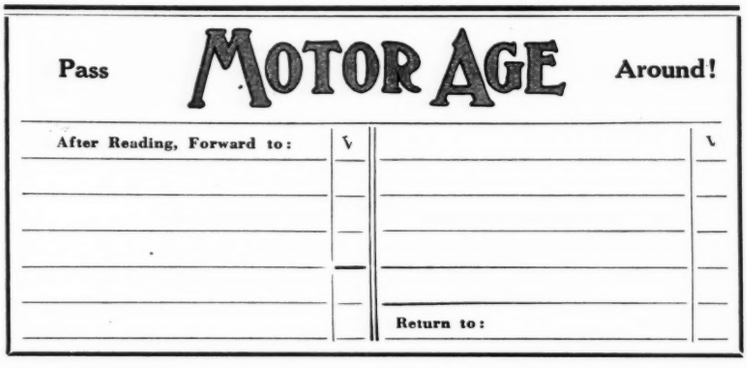
Every copy of MOTOR AGE that reaches you contains dozens of ideas that can be worked out to a profit in the Sales and Service departments of any automotive establishment. Many of these ideas you perhaps have anticipated, while others are the kind that you need and are seeking.

But—isn't it just possible that some of the ideas in every number might be of direct help to those associated with you if brought to their attention? Perhaps some of the men in your employ would welcome an opportunity to keep themselves up-to-the-minute on the news and progress of the trade, and be the more efficient for doing it. Many of our dealer subscribers find this to be the fact, and tell us that it pays them to

Pass MOTOR AGE Around

It would probably pay you also to "pass MOTOR AGE around." It's not hard to do. Merely paste one of our routing labels on each copy, fill in the names of the men you want to see it, and start it on its way.

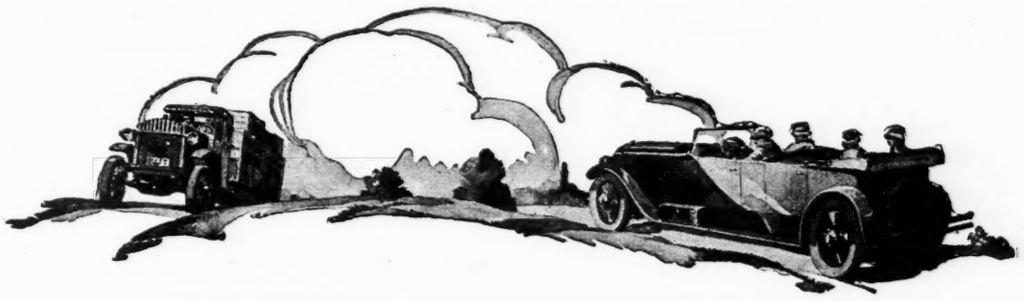
Here's the Label



We supply you with them gratis upon receiving your request to do so. We find them a useful thing in passing magazines around in our own office, and we are sure that you would find them just as useful as an aid in passing MOTOR AGE around.

Write for the labels. Try passing MOTOR AGE around. You'll find it pays.

MOTOR AGE 5 So. Wabash Ave., Chicago, Ill.



There is a LYCOMING Motor to fill the power needs of nearly every class of passenger car and light truck

FOR the finest types of passenger car, there are several models of the Lycoming Eight-in-Line —an engine of remarkable flexibility and yet simple, compact, smooth running and quiet.

For the broad market of passenger cars in the intermediate price range, there are Lycoming Sixes and Fours, staunch, economical and dependable to a degree unusual even in the present advanced state of automobile engine development.

Lycoming Fours are also made for the severe and exacting service of light delivery trucks (up to and including 2 tons).

Every Lycoming engine is assurance of satisfaction-building performance for car or truck manufacture.

Full information will be sent promptly to any manufacturer on request.

LYCOMING MANUFACTURING COMPANY
Makers of fine Fours, Sixes and Eights-in-Line
Williamsport, Pennsylvania

LYCOMING *Motors*

FOURS — SIXES — EIGHTS-IN-LINE

Every Week

There are so many important articles, current news items, and interesting features in the fifty-two issues of Motor Age each year, that subscribers find it most profitable to read carefully through every issue when it comes.

The timeliness of its contents is one of its most valuable assets.

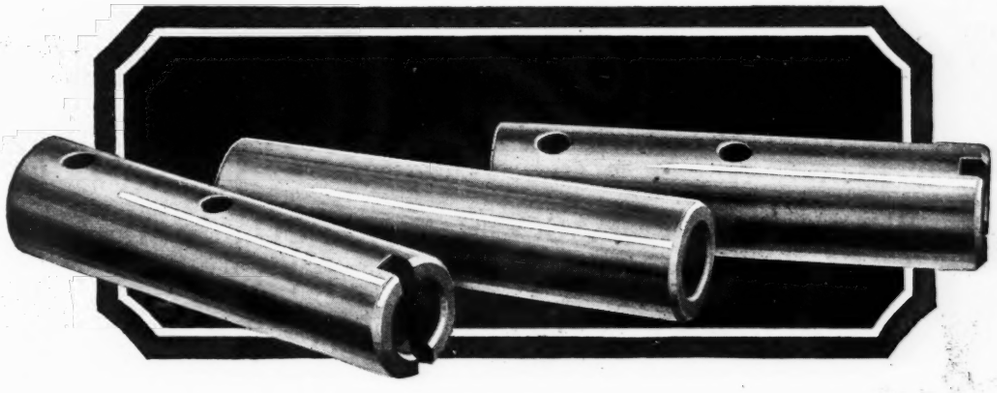
Make it a point to look through Motor Age while its news is still fresh, and you will see why it is that its oldest friends and most loyal supporters read it regularly, every week.

MOTOR AGE

5 So. Wabash Ave., Chicago, Ill.

Piston Pins are like eggs

You can't tell their quality by outside appearance



All McQuay-Norris piston pins are made from S. A. E. specification solid bar stock. Some pins are made from tubing — it's cheaper.

All McQuay-Norris piston pins are triple heat treated. Once to carbonize the outside, or case—a second time to toughen the inside, or core—a third time to harden the outer surface. Some pins get only one or two heat treatments.

All McQuay-Norris piston pins are heat treated in Electric Furnaces, because more uniform results can be secured. Gas and oil furnaces are cheaper.

All McQuay-Norris piston pins are exact duplicates of original factory equipment.

The highest standard of workmanship plus top quality material are combined in all McQuay-Norris products — piston rings, pistons, pins and bearings.

Remember

The best profits are in the best parts. Poor replacement parts can ruin a good mechanical job.

McQUAY-NORRIS PISTON PINS

The Complete McQUAY-NORRIS *parts line*

PISTON RINGS - PISTONS - PINS - BEARINGS

McQUAY-NORRIS MANUFACTURING COMPANY. *General Offices:* ST. LOUIS, U. S. A.

Factories: St. Louis, Indianapolis, Connersville, Ind.; Toronto, Canada

The Only Autowline that is:

(1) Made of the famous, nationally advertised Yellow Strand Wire Rope.

(2) Equipped with Patented Snap Hooks that are the last word in simplicity and efficiency.

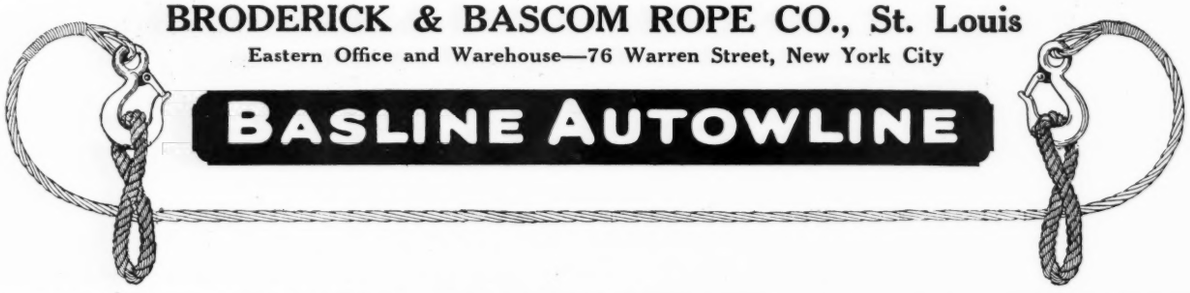
(3) Well established because it has been backed by years of national advertising.

(4) Strong enough to stand a 6000 lb. pull and yet weighs only 4½ lbs. and coils neatly under a seat cushion.

BASLINE AUTOWLINE pays Jobbers and Dealers a good profit, too. Write for Price List and descriptive literature.

BRODERICK & BASCOM ROPE CO., St. Louis

Eastern Office and Warehouse—76 Warren Street, New York City



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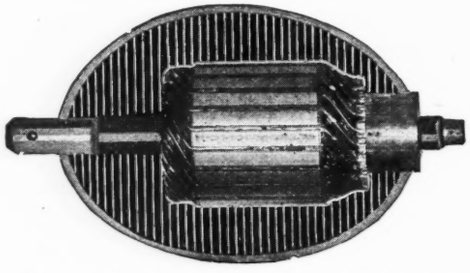

Rewinding 'em Right!

102 operations, careful inspection, safe packing—we don't take a chance in guaranteeing Fredericks Rewinds for 90 days. So the garageman's profit is safe—repeat business sure. Let us send the price list.

FORD Generator Armatures Rewound	$1.50
FORD Starter Armatures Rewound	1.50
ALL OTHER TYPES TWO UNIT Generator Armatures Rewound	3.25
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GUARANTEED to give the same satisfaction as new armatures.

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Rewinding Service

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"Conneaut" Plastic Metallic Packing on Leaky Motor Engine Water Pump Shafts

It is in putty form. It becomes a perfect fit to the worn shaft by tightening the gland, making an adjustable metal bushing which may be tightened to take care of natural wear, the same as a fiber packing. Never wears out and does not cause further wear on the shaft. It is a permanent repair for the leaky water pump.

Put up in one and five pound cans. Ask your jobber.

The Conneaut Packing Co.

Conneaut, Ohio

Why a Million Ford Owners Prefer MILWAUKEE

WM. WUERTHELE
Oldest Independent
BILLIARD & BOWLING SUPPLY HOUSE
in Western Pennsylvania
412 DIAMOND STREET
PITTSBURGH, PA.

Milwaukee Motor Products Co.,
Milwaukee, Wisconsin.

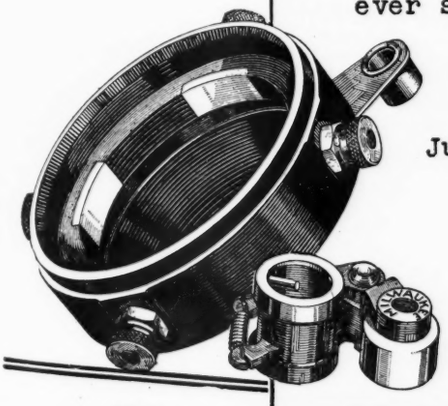
Gentlemen:

I want to compliment you for putting out a Ford Timer which by test I have found to be the greatest improvement I could put on my car. If I were to have my engine completely overhauled I doubt whether it would improve the power, speed and regularity of firing as did your little device. I have been driving Fords since 1914 and I assure you I know of no other improvement that compares with your Milwaukee Timer.

In short, I consider it the best $2.00 I ever spent on a Ford Car.

Respectfully yours,

June 1st, 1925. Edwin J. Wuerthele.



MILWAUKEE TIMER for FORD

SHORT-PROOF

MULTIPLY this letter by many thousands and you have some idea of the enthusiasm Ford owners have for the Milwaukee Timer. Then think of over 36,000,000 ads in national and sectional magazines driving home Milwaukee's superiority. Thousands of these advertisements reach *your customers.* Better put Milwaukee Timers on your "want list" now!

MILWAUKEE MOTOR PRODUCTS, Inc., *Milwaukee, Wisconsin*

MORRISON

Automatic Double Range

Worm Drive JACKS

Special model for Balloons

Can't Slip or Tilt

Flexible steel "Sure Hold" cap prevents dangerous slipping. Long folding handle (36 to 72 in.) operates from standing position. Gets under overhanging bodies. Easy to work. Few turns and it's up. Built in 11 sizes for all service requirements up to 8 tons. Furnished as standard equipment on fine passenger cars, trucks, buses and Fire Apparatus for past 4 years. The Jack for YOUR shop. Write for sample for test.

THE WOODS ENGINEERING CO., Alliance, Ohio

Jacobs Quality Chucks

Look for a Jacobs Chuck on the Drill you buy—

The patented Tooth and Sleeved Key feature saves time, prevents slippage, reduces the breakage of drills and gives greater accuracy. Jacobs Chucks are the specified equipment of 132 makers of Drilling Machines and Portable Drills.

BIG MONEY IN THIS SERVICE

Dealers and shops make big money through the control of a franchise which entitles them to the exclusive use of the patented "KLEAN RITE" system of washing and polishing automobiles.

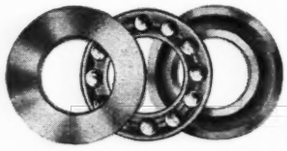
This system has turned a job into an impressive, highly profitable business.

Write for full particulars

Klean-Rite Auto Laundry Company

1710 East 75th St. Chicago, Ill.

The Bearings Company of America



Your present Thrust Bearings sizes duplicated.
Thrust Ball Bearings made to your B/P's.
Quotations made promptly on all inquiries.

THE BEARINGS COMPANY OF AMERICA, Lancaster, Pa.
Western Sales Office, 1012 Ford Bldg., Detroit, Mich.

MONOGRAM

ORIGINAL

SELF LOCKING RADIATOR CAP

THE KINGSLEY-MILLER CO.
Successors to
(General Automotive Corporation, Chicago)
600 West Jackson Boulevard · · Chicago

The Money-Making Line—

WILLYS-OVERLAND

Fine

MOTOR CARS

No Chatter, No Digging In

Smooth, Round Holes,
Twice Ordinary Expansion,
Extra Long Pilot,
Money-back!

Each blade of a PAROB Reamer cuts at a different angle. Cuts absolutely smooth, round holes. Twice the expansion of ordinary reamers. Screwdriver adjustment. No exposed locking devices. Honed as easily as any straight-fluted reamer. Burr cutter on end of pilot.

Made in all sizes. Can be made in multiple series. Ask about Gammons Taper Pin Reamers. They reduce costs of reaming for taper pins two-thirds. Price-list mailed to all.

PAROB EXPANSION HAND REAMER

THE GAMMONS-HOLMAN CO.
DEPT. C, MANCHESTER, CONN.

PAT. APPLIED FOR
THE IDEAL SHUR O BATTERY CONNECTOR TWINS
Will Stay on the Job Day and Night for YOU
BURTON & ROGERS MFG. CO.
75 BOYLSTON ST. BOSTON, MASS.

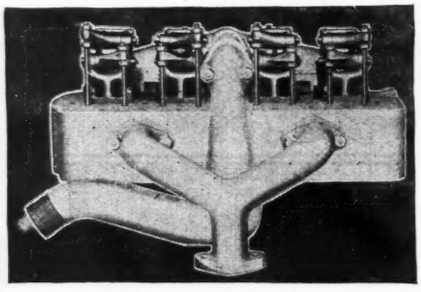
Johns-Manville

ASBESTOS BRAKE LINING

ROOF 16 OVERHEAD VALVE EQUIPMENT

For Ford and Dodge Motors

ROOF 8 VALVE HEAD FOR FORD MOTOR



Stupendous Power—Lightning Speed

Ford racing cars with Roof Equipment are rivals on mile and one half mile tracks of the highest priced racing cars. Doubles the pulling power of the Ford or Dodge pleasure car or truck. Hill climbing and general road work beyond wildest dreams of the owner. Complete — ready for installation — no machine work necessary.

We are headquarters for all speed equipment. No matter what you want, write us. Racing quality —lowest prices. A postal card brings you complete list of our specialties.

Jobbers—Dealers—Consumers—Write Us.

THE LAUREL MOTORS CORPORATION, ANDERSON, INDIANA

NEXT WEEK

—is the time to read next week's issue of MOTOR AGE, as you are reading this week's issue this week.

MOTOR AGE

5 So. Wabash Ave. Chicago, Ill.

Nationally Advertised!

Write to-day for catalog and sales plan.

GEMCO MFG. COMPANY
760 S. Pierce St. Milwaukee, Wis.

Gemco BUMPERS

"WHITNEY"

SILENT HIGH MILEAGE CHAINS

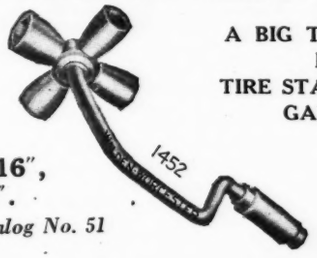
Satisfied Customers
Your Best Recommendation

Distributors in All Principal Cities

THE WHITNEY MFG. CO.

HARTFORD Connecticut

FOUR SOCKET RIM WRENCH



A BIG TIME SAVER FOR TIRE STATIONS AND GARAGES

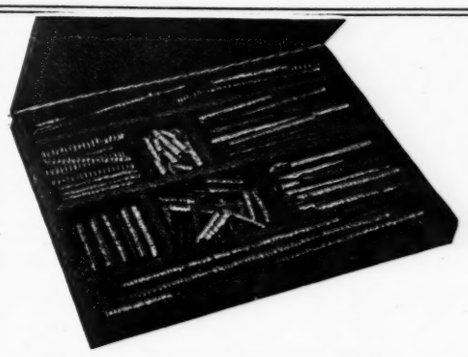
Four Sockets 5/8", 11/16", 3/4", 7/8".

Ask for Catalog No. 51

WALDEN WORCESTER WRENCHES

WALDEN-WORCESTER
INCORPORATED
WORCESTER, MASS.

PECK SPRINGS



$3.50 LIST

The Spring You Need When You Need It!

A very complete assortment that includes practically every spring needed in automobile repair work. About 250 springs ranging from 1 in. to 10 in. in length and up to ¾ in. in diameter, in extension and compression varieties. Both Steel and Brass, Japanned finish. Packed in a sturdy box arranged in compartments for quick, easy handling. If you get only 25c per spring, your profit on this PECK assortment will be $59.00. A real money-maker for the Dealer and Garage. When ordering direct be sure and mention your Jobber's name.

The Peck Spring Co., Plainville, Conn.

A New Chapter Every Thursday

Each issue of MOTOR AGE is a new chapter, continuing the story of the development of the industry.

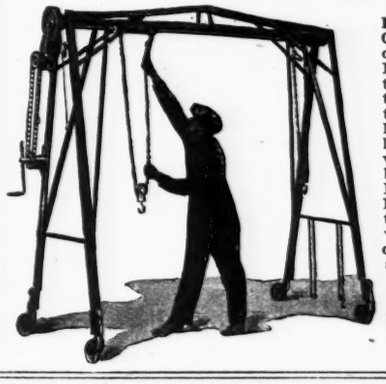
And for those who apply the new ideas it gives them, it also continues the story of the development of their individual success.

Read MOTOR AGE every week.

MOTOR AGE

5 So. Wabash Ave. Chicago, Ill.

Get a Manley



Portable Hoist. A Universal Garage lifting method without an equal. The Manley Hoist is superior because the chains can be positioned anywhere between the legs, thus raising the load always vertically. The legs are doubly braced and will not spread. Automatic brake to lower the load. Legs folded together and Hoist may be placed against the wall entirely out of the way. Two leverages with corresponding speeds. Light, strong and easily moved.

Send for Catalog.

MANLEY MFG. CO.
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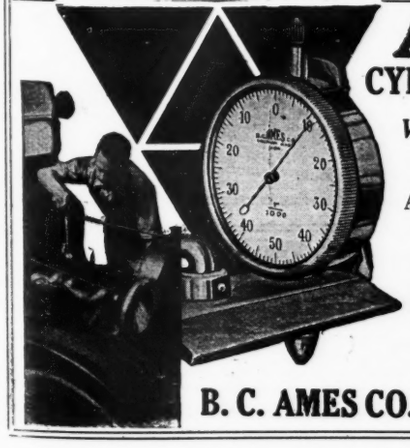


AMES Jr. CYLINDER GAUGE

With Setting Tool Handle

All the time saving facts in a glance at the dial

Price $17.50

Buy from Your Jobber or Send for Folder

B. C. AMES CO., Waltham, Mass.

Perfectly Balanced!

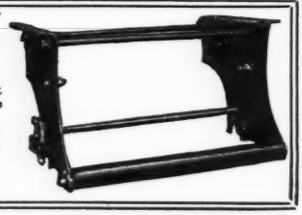
Every spoke of uniform size, weight, and strength. Folded seam along inner side of spoke gives strength of four thicknesses of metal. Withstands severe shocks without collapsing.

Made for Ford, Gray, Star and Chevrolet cars. Price $28.50 per set. Natural wood or Duco finish at slight extra cost. Standard colors:—black, red or blue enamel. Write for descriptive Folder HS-7.

The Dayton Wire Wheel Company, Dayton, O.

BRADLEY
Auto Trunks & Racks

Simple in design. Light in weight. Easy to install. No drilling or fitting. For Buick, Hudson, Essex, Chevrolet, Maxwell, Chrysler, Reo, Dodge, Rollins, Hupmobile, Studebaker, Willys-Knight and Overland.



Bradley Motor Products Co.
Fostoria, Ohio

UNITED STATES
Portable Electric
DRILLS

Built by the oldest maker of Portable Electric Drills in the World.

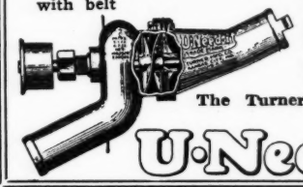
Ask for Catalog 105 THE UNITED STATES ELECTRICAL TOOL CO.
Cincinnati, Ohio, U. S. A.

Goodrich
AUTOMOTIVE EQUIPMENT
Cable
Starting—Lighting—Ignition
Formerly M.R.

Goodrich Cable is sold in lengths found to be the most popular with the average buyer—coils of 100 ft. packed in individual cartons. Both shop men and car owners like the clean 100 ft. package idea—and this leads to quick and profitable sales.
Send for samples, prices and discounts.

THE GOODRICH-LENHART MFG. CO., Hamburg, Pa.

$5.50 with belt



The Big Seller in the Ford Pump field—at a new low price. Get our dealer plan.

The Turner Mfg. Co., 31st and Roanoke Rd. Kansas City, Mo.

U-Need-It ROTARY PUMP *for* FORDS

KISSEL
CUSTOM BUILT

The Kissel Dealer does not meet competition. He makes others meet it.

KISSEL MOTOR CAR CO., Hartford, Wis.

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CHICAGO ROLLER SKATE CO.
Manufacturers of Screw Machine and Automotive Products
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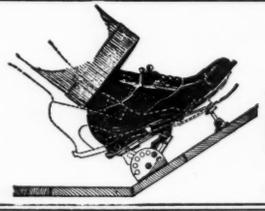
Model G-16
Quincy Silent Air Master
Manufactured by
Quincy Compressor Co.
Name Formerly Wall Pump & Compressor Co.
217 Maine Street, Quincy, Ill., U. S. A.



The Adams Adjustable Foot Rest

Adjusts comfortably and easily to most convenient height for any driver's leg. Foot lies in normal restful, uncramped, safe position. Big, fast seller. Senior, $3.50. Junior, $1.25. Ask your jobber.

Adams Mfg. Co.
Galesburg, Ill.

RAMCO
Cushion
INNER RINGS

fit behind piston rings and keep them in perfect contact with the cylinder walls at any motor speed or temperature.

RAMSEY ACCESSORIES MFG. CORP., ST. LOUIS, MO.

STOLEN

Millions of dollars worth of cars each year. This new switch locking device fits Ford, Star, Gray, Overland, Maxwell or any car with Ford type switch. Ordinary padlock completes it. Retails for $1.00.

"As good as the best, cheaper than the rest"
GET THIS EXTRA PROFIT
Jobbers and Dealers: Write for prices and information.

IDEAL AUTO LOCK MFG. CO.
Protected 325 Felt Bldg., Salt Lake City, Utah

Moto Glo can be attached to any size Motor Meter and "Sees at night." Supplied with red, green and amber eyes. The eyes and side windows light up. Complete with socket, bulb and cable. Send for samples and catalogue showing 50 new members.

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MOTO GLO "Sees at Night"

PROTECTOMOTOR REG. U.S. PAT. OFF.
Perfect Positive Protection

Filters all dust, sand and grit out of air supply to carbureter and motor. Write us for facts.

STAYNEW FILTER CORPORATION
Rochester, N. Y.

99 9/10 EFFICIENT

Free write for your copy

The Book "AIR PROFITS" Shows how to get more work out of an air compressor. How to use compressed air for many pay jobs.

BRUNNER MFG. CO.
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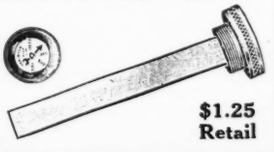
BRUNNER AIR COMPRESSORS

A Quick Seller and a Tremendous Market

FORD, CHEVROLET and OVERLAND owners buy this TASCO Gauge on sight. It screws in place of the filler cap—saves "measuring" the gas—and it is guaranteed for the life of the car. They sell all the time.



THE AKRON-SELLE CO., Akron, O., U.S.A.

$1.25 Retail

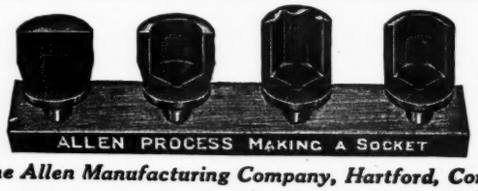
The Original **Bosch**

Franchise details for selling ORIGINAL BOSCH Automotive Equipment will be sent to any Distributor, Dealer or Service Station on request.

ROBERT BOSCH MAGNETO CO., Inc.
109 West 64th Street New York, N. Y.

ORIGINAL BOSCH units bear the full name, Robert Bosch, and the trade mark shown at left. These are the identifications of Bosch quality—famous since 1887

Cold-Drawn Sockets



ALLEN Wrench Sets

The Allen Manufacturing Company, Hartford, Conn.

ZENITH CARBURETOR

More Power Less Fuel

Zenith - Detroit Corporation, Detroit, Mich.

HALL'S CYLINDER HONE

They Won't Come Back

Those jobs won't come back showing oil passing, compression loss and crank-case dilution if you use a Hall Hone. The Hall makes cylinders both round and parallel. Ask your jobber.

THE HALL MFG. COMPANY
507 Hall Bldg., 1600-06 Woodland Ave.
Toledo, Ohio

TEMCO

Portable Electric Tool
The highest grade for the automotive trade.
The Temco Electric Motor Co.
707 Sugar St., Leipsic, Ohio

Rubber Tubing for the Trade

EKLA radiator hose—All-Rubber or Cloth-Inserted, tire pump hose and windshield wiper tubing, all in standard lengths, will show you better profits and your customers better service.
Insist on EKLA Brands when buying these items.
THE ECLAT RUBBER COMPANY
Cuyahoga Falls, Ohio

Kawneer
SOLID COPPER
STORE FRONTS
Write for Special Book Garage Front
THE KAWNEER CO., 2224 Front St., Niles, Mich.

TIMKEN
Tapered
ROLLER BEARINGS

NO TOOLS—It's Self-Closing

Repair Link for Broken Cross Chains
A Flower City Self-Closing Link attached with fingers to loose ends of broken chain closes and locks on first turn of wheel. Stops clanking—saves fender—low-priced. Box of 10 Links retails for 25 cents.
Write for samples and discounts.
Distributors wanted.
FLOWER CITY SPECIALTY CO.
Rochester, N. Y.

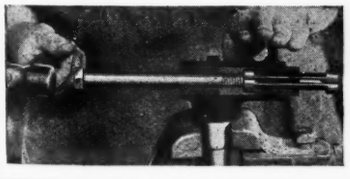
Pump and Tank Headquarters
S. F. BOWSER & CO. Inc.
FORT WAYNE, IND.

Write for Attractive Discounts

Always Insist Upon
Genuine
Apex Innerings
Most good Jobbers stock them
If it isn't an Apex—It isn't an Innering
THOMSON MFG. CO.
Dept. C Peoria, Ill.

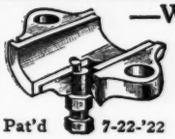
CURTIS
AIR COMPRESSORS-HOISTS-TROLLEYS-CRANES
ST. LOUIS
C.P.M'f'g Co.

Curtis Pneumatic Machinery Co.
1527 Kienlen Ave.
St. Louis, Mo.



DIERINGER
BUSHING REMOVER
Any spindle bushing out in two minutes! Merely insert tool, drive out with hammer. Full set of 3 sizes covers all cars, $4.50. Write for trade discount. Distributors wanted.
E. T. Dieringer, Box 282, Bolivar, O.

TAKE THE END-PLAY OUT!
—WITHOUT PULLING THE MOTOR



Pat'd 7-22-'22

THE C. A. ADJUSTABLE CENTER BEARING CAP corrects Ford crankshaft end play and sets magneto for highest efficiency without removing the motor. Easily and quickly installed. Guaranteed for one year. List price $3.75. Ask your jobber or dealer or write us direct.
ADJUSTABLE BEARING CO., Inc.
Dept. M. Brazil, Indiana

CLASSIFIED ADVERTISING

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DOWMETAL PISTONS
Lighter, stronger, and longer wearing than aluminum or iron. Can be fitted with bronze bushings in the wrist pin holes same as in iron pistons. Dowmetal has no permanent growth. The expansion is little more than iron.
SEND FOR PARTICULARS
LAMMERT & MANN CO.
Cylinder and Crankshaft Grinding
215-21 N. Wood St. CHICAGO Phone West 4918

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AUTO PARTS
SAVES 50% to 75% ON ALL CARS
New and Used Gears—Springs and Axles—Cylinders—Motors—Rear Systems, etc. Wire or Write
INDIANA AUTO PARTS CO.
316-18 NO. ILLINOIS ST. INDIANAPOLIS, IND.
LARGEST CAR WRECKERS IN INDIANA

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Formerly Member Examining Corps, United States Patent Office
American and foreign Patents secured. Searches made to determine patentability and validity. Patent suits conducted. Pamphlet of instruction sent upon request.
McGill Building, WASHINGTON, D. C.

PATENTS & PATENT ATTORNEYS

HOUSE OF A MILLION AUTO PARTS
The largest stock of new and used car and truck parts in the world. We have everything. Always mention model and serial number in order. Write us. All inquiries answered promptly.
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Secured, Trade-Marks and Copyrights Registered
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MANUFACTURER WANTED

WILL LICENSE—Responsible Manufacturer to make improved cut-out. Fully patented. Far superior to other types. Royalty basis. Write Olin H. Wilson, 322 W. Jefferson Ave., Arkansas City, Kansas.

BUSINESS OPPORTUNITIES

FOR SALE—Garage, centrally located in growing town; also will transfer contract for most popular automobile agency to purchaser. Box 6237, Motor Age, 5 S. Wabash Ave., Chicago, Ill.

FOR SALE

FOR SALE—One No. 55 Heald Cylinder Grinder. 90 per cent new. Price right. Box 6238, Motor Age, 5 S. Wabash Ave., Chicago, Ill.

In a dozen places on the overhaul job

KEY
Graphite Paste

You'd be surprised how many times you can reach for the KEY Graphite Paste and use it effectively on every overhauling job.

And the same applies as well to many minor repairs from gasket paste to spring lubrication.

Convenient and easy to keep on hand. Get your free sample now.

We let you try it before you buy it.

KEY BOILER EQUIPMENT CO.

27TH AND McCASLAND AVE.
EAST ST. LOUIS, ILL.

Sample FREE

Key Boiler Equipment Co.
27th and McCasland Ave., East St. Louis, Ill.

Please send me without charge or obligation a sample of Key Graphite Paste.

NAME.....

FIRM.....

ADDRESS.....

M. A. 7-30-25

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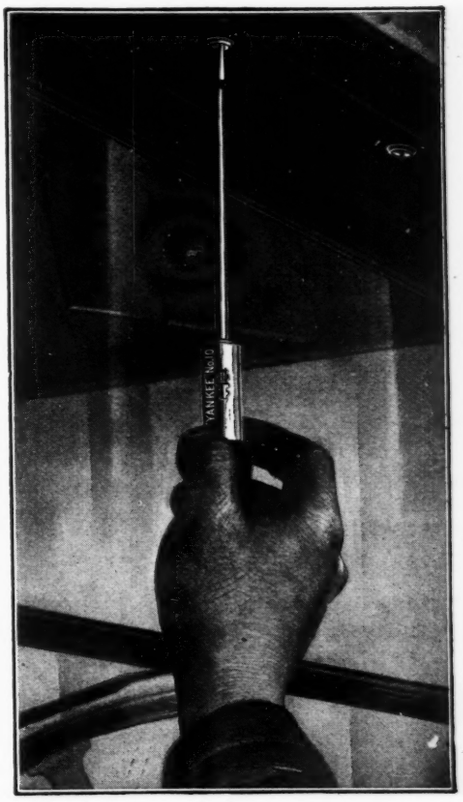


Let the "YANKEE" Ratchet *do the work*

Driving (or drawing) screws on visor as shown above, requires you to stretch upwards to do the job.

What a big help it is to have a "Yankee" Ratchet Screw-driver No. 10.

All you need do is to set the little Ratchet Shifter, and turn to and fro.

The "Yankee" Ratchet does what your muscles would otherwise have to do, and saves your time.

Just like winding your watch. Your first grip need not be relaxed until screw is in, or out. All the tiresome grip-and-let-go done away with.

"YANKEE" Ratchet Screw-drivers
Right and left ratchet; and rigid

No. 10—(Illustrated). Blade lengths, 2, 3, 4, 5, 6, 8, 10 and 12 inches.

No. 11—Same as No. 10, except that Ratchet Shifter moves across instead of parallel to barrel.

No. 15—(Illustrated). Has handy knurled thumb turn for starting small, wobbly screws. Blade lengths, 2, 3, 4, 5, 6 and 8 inches.

Some other "Yankee" Tools

Ratchet Breast Drills — Ratchet Bit Brace
Ratchet Hand Drills — Ratchet Bench Drills

"Yankee" on the tool you buy means the utmost in quality, efficiency and durability

Dealers everywhere sell "Yankee" Tools

NORTH BROS. MFG. CO., PHILADELPHIA, U. S. A.

"YANKEE" TOOLS
Make Better Mechanics

Writers who mould automotive thought

Producing a Newsy, Well Balanced, Interesting Publication Is His Forte

SAM SHELTON
Editor
MOTOR AGE

There are many men who regard an editorship as an opportunity to ride a hobby. They make a publication that conforms to their ideas of what the readers *ought* to like and not what they really want.

Not so Sam Shelton, editor of MOTOR AGE. He is a highly successful editor because he seems to have an instinctive knowledge of what dealers want in a trade paper—and gives it to them.

It's no easy task to produce a well balanced publication that will be interesting to all readers—but Shelton has just that knack. He might be compared to a famous chemist who deftly mixes various ingredients in proper proportions and produces something of great value to the industry. So Shelton mixes his news, articles, descriptions, etc., and turns out an issue that mightily pleases its recipients.

Shelton was born in Missouri—and—like all Missourians—must be shown. Anything that gets by him has to be good. He has a highly developed sense of news value, the result of many years of experience in the newspaper field, and unerringly selects the material which will be of the greatest interest to the readers of his publication. This is one reason why MOTOR AGE is increasingly popular with the man in the trade.

This is the third of a series of announcements dealing with the editorial strength of Chilton Class Journal publications. Each issue will carry a brief sketch of an editor or principal contributor to the group.

The purpose of this series is to place before you the facts about our editorial work so you may know its scope and magnitude and the ability, experience and attainments of the men whose articles you read in these publications.

As a writer Shelton was always drawn to work that requires diligent investigation and keen analysis and which results in the spreading of useful information, the promotion of constructive effort, the correction of evils and the rendering of a definite service. It is these qualities which make his articles so valuable to MOTOR AGE readers.

On leaving college, Shelton bought a weekly country newspaper, later joining the staff of the St. Louis Post-Dispatch, where he remained for some years. He also was director of publicity for the Associated Industries of Missouri, helping in the organization and direction of this large association of manufacturing and business firms.

In his present connection Shelton has done much to increase the editorial prestige of the Chilton Class Journal Company.

EATON

STRONG—BEAUTIFUL—PERFECT FITTING BUMPERS—that associate themselves so naturally with the finer cars.

Custom-made attachments—and that exclusive Eaton 2-ton Tested Design—widely imitated but never equalled.

There's an Eaton Wholesaler near you with a complete stock for quick deliveries in quantities desired.

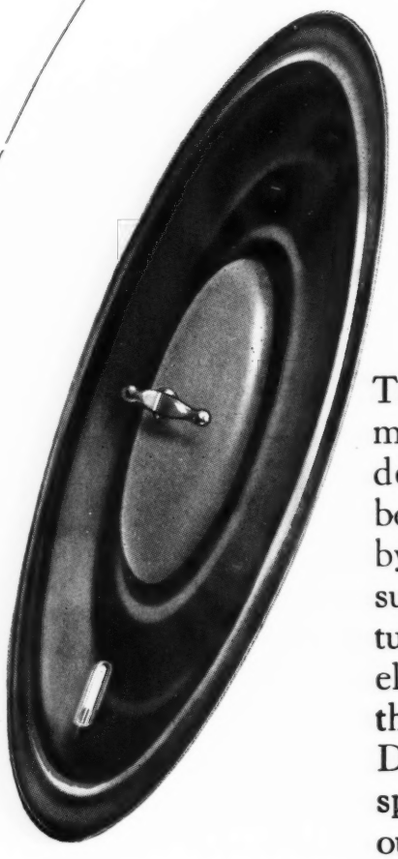
THE EATON BUMPER & SPRING SERVICE CO.

(The Eaton Axle & Spring Company, Manufacturers)

CLEVELAND CHICAGO NEW YORK PHILADELPHIA BOSTON
DETROIT DALLAS ALBANY ATLANTA

BUMPERS

Disteel



There are partisans of demountable wheels and of demountable rims. But both so much prefer wheels by Motor Wheel that we supply more car manufacturers than does anybody else. . . . Tuarc to permit the spare tire merely. . . . Disteel to provide the whole spare wheel. Both show our talent for building only fine wheels of every type.

MOTOR WHEEL CORPORATION
LANSING, MICHIGAN
Wood Wheels, Steel Wheels, Stampings

Tuarc

Motor Wheel PRODUCTS